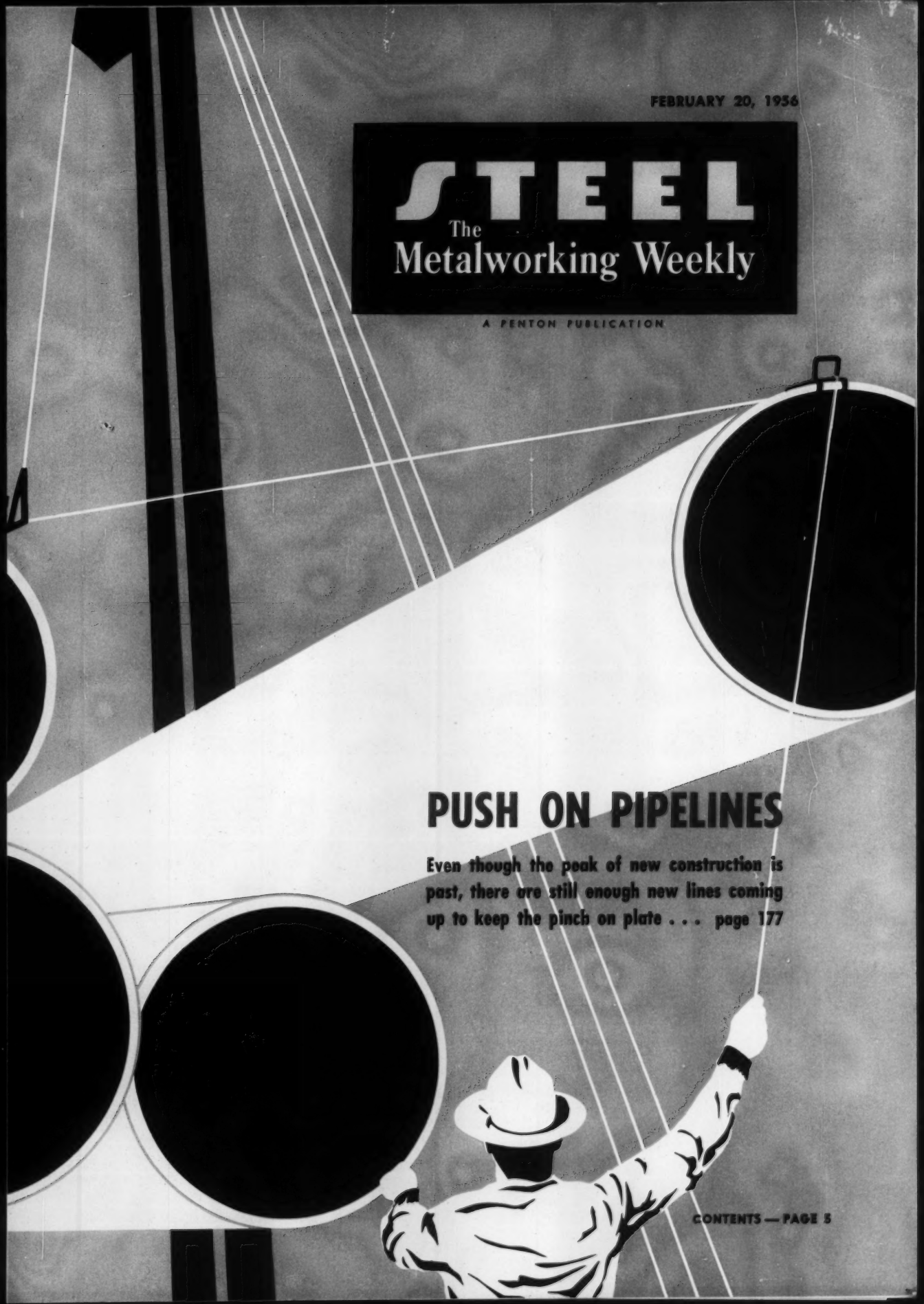
FEBRUARY 20, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION



PUSH ON PIPELINES

Even though the peak of new construction is past, there are still enough new lines coming up to keep the pinch on plate . . . page 177

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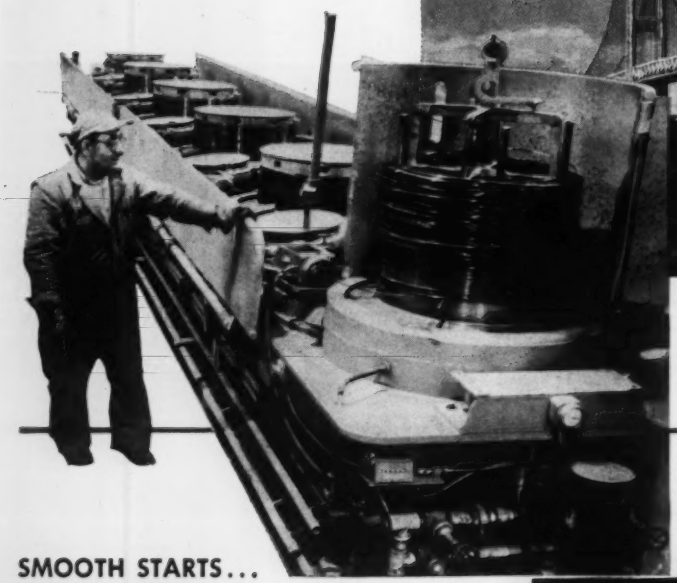
EC&M Control helps maintain steady production of wire for giant cables on Mackinac Bridge

Bridge Drawing — Courtesy of Dr. D. B. Steinman, Cons. Engr. Installation photos — Courtesy of American Steel & Wire Division of U.S. Steel Corporation and Vaughn Machinery Co.

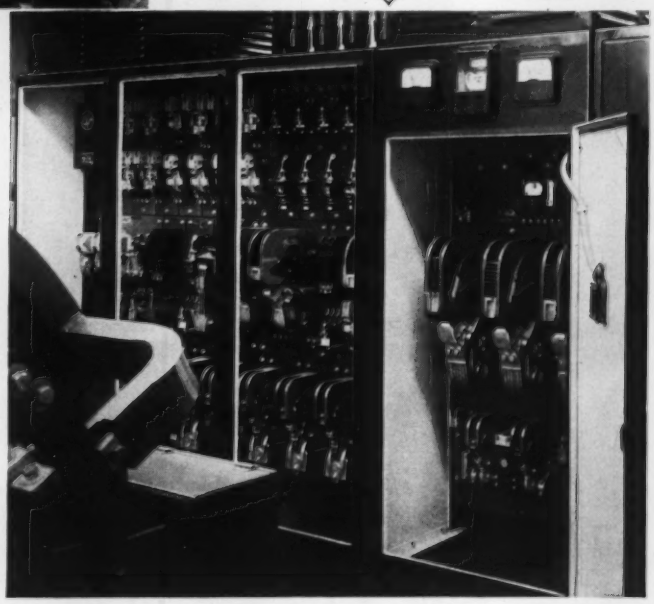


EC&M Wire block Controller (at left) for 60/75 HP, 500-1800 RPM, 230 Volt Motors. At right is 725 HP, 440 Volt Synchronous Motor Starter and Circuit Breaker Panel (with door closed) for 500 KW Generator.

SMOOTH STARTS... QUICK STOPS... WIRE IS DRAWN AT SPEEDS UP TO 700 FEET PER MINUTE

Mackinac Bridge, for connecting the two peninsulas of Michigan, will soon stand as a great link in our national highway system. Scheduled for completion in 1957, EC&M Control will have played an important role in this project by helping maintain a steady flow of 0.192" diameter wire to this important project. Wire is drawn from rods to make up the 2-ft. diameter suspension bridge cables. EC&M Control, *engineered* for the task, will have helped produce millions of feet of wire before the first auto crosses this outstanding highway link.

Ability to thread at slow speed, accelerate smoothly to continuous drawing speed, and quick-stopping when the reel is finished, a snarl develops or the wire breaks, are essential to good wire-drawing. Control for wire machines is custom built to the size and number of motors per machine and to the ever-increasing production-speed that is being required. Consult with EC&M whenever wire-drawing problems arise.



THE ELECTRIC CONTROLLER & MFG. CO.

Division of the Square D Company

4498 LEE ROAD • CLEVELAND 28, OHIO

6760

XIV

This is the fourteenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Silicon - What It Is and What It Does in Alloy Steels

Silicon is a very abundant nonmetallic element, one of the chief elementary constituents of the earth's crust. In the form of ferrosilicon, it is used by steelmakers as a deoxidizer and hardener in both alloy and carbon steels.

When the maximum silicon content is specified within the limits of 0.60 to 2.20 pct, the resulting steel is classed as a silicon alloy steel. However, all other standard alloy grades are specified to a range of 0.20 to 0.35 silicon for purposes of deoxidation. Silicon has several interesting effects, among them three that should be noted carefully: (1) it raises the critical temperature for heat-treatment; (2) as the amount is increased, it increases the susceptibility of steel to decarburization and graphitization; (3) combined with other alloying elements such as nickel, chromium, and tungsten, it promotes resistance to high temperature oxidation.

Silicon-Manganese Steels

Of the alloy steels relying heavily on silicon, one of the most important groups is the silicon-manganese series. As mentioned above, silicon is recognized as a deoxidizing agent, and a powerful one. Manganese behaves in the same manner but to a lesser degree.

Manganese exerts beneficial effects on the mechanical properties of heat-treated steel. Silicon as an alloy increases the strength. A properly balanced combination of the two elements produces a steel with unusually high strength, and with good ductility and shock-resistance.

Silicon-manganese steel has been widely used for the making of coil and leaf-type springs. It has also been used successfully for chisels, drift pins, punches, shear blades, mine bits, and other products that must be shock-resistant. It responds readily to oil-quenching, and when tempered at the correct temperature, it possesses not only shock-resistance but toughness and strength.

We invite you to consult with Bethlehem metallurgists whenever you wish to know more about silicon and its uses in steel. If you care to have them do so, these technicians will gladly suggest the proper analysis for your particular needs. Whatever it is, Bethlehem can furnish it, for Bethlehem makes all AISI standard alloy steels, as well as special-analysis steels and the full range of carbon grades.

If you would like to have a reprint of this advertisement, or of the entire series from I through XIV, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

MORE THAN 300 LEADING MANUFACTURERS

are already putting

SKF TYPE "C" BEARINGS

in their products

Here are the trade marks of a few of more than 300 leading manufacturers – companies who want extra bearing performance – who already are using the *improved* SKF Type "C" Spherical Roller Bearing announced less than a year ago.

There are two reasons why

First: They know that for over 40 years, SKF has been *first* with anti-friction developments that *work*.

Second: They obtain, size for size, up to 50% more capacity, 2 to 3½ times increased life with SKF's Type "C" Spherical than they can obtain with any other available design, and at no increase in cost.

7550

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA
– manufacturers of **SKF** *and* HESS-BRIGHT® *bearings.*

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SKF
BALL AND ROLLER BEARINGS

KLING COMBINATION
SHEAR, PUNCH AND COPER

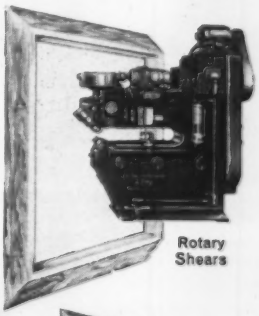
One machine does ALL These Jobs and MORE!

Its Magic Performance Can Win You Many "Production Oscars"

This "jack-of-all-jobs" will do the work of a half dozen machines, yet it does not take up any more floor space and represents very little more investment, than a shear or punch, or any other single-purpose machine.

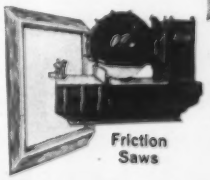
Here is another production-boosting and cost-cutting feature: with this versatile machine two men, working on each side of the machine, can turn out the same or totally different jobs, at the same time! Enables you to double output, using your present staff.

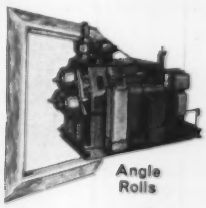
Available in 3 sizes for light, medium or heavy work. Kling Combination Shear, Punch & Copers are speeding production and cutting costs "in the best of companies." Write us for names of some of these firms in your industry —and also for a copy of the New Kling Combination Bulletin No. 347-A.


Rotary Shears

Also Write for Complete Line Bulletin 100, Showing KLING Metal Working Machines

This bulletin is practically a miniature catalog—fully illustrates and describes these machines and all the others in the complete Kling line of Metal Working Machines. Send for it today.


Friction Saws


Angle Rolls

Since 1892

Kling

Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

1244R

BROS. ENGINEERING WORKS

1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS

Makers of Friction Saws; Shears—Rotary, Double Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.
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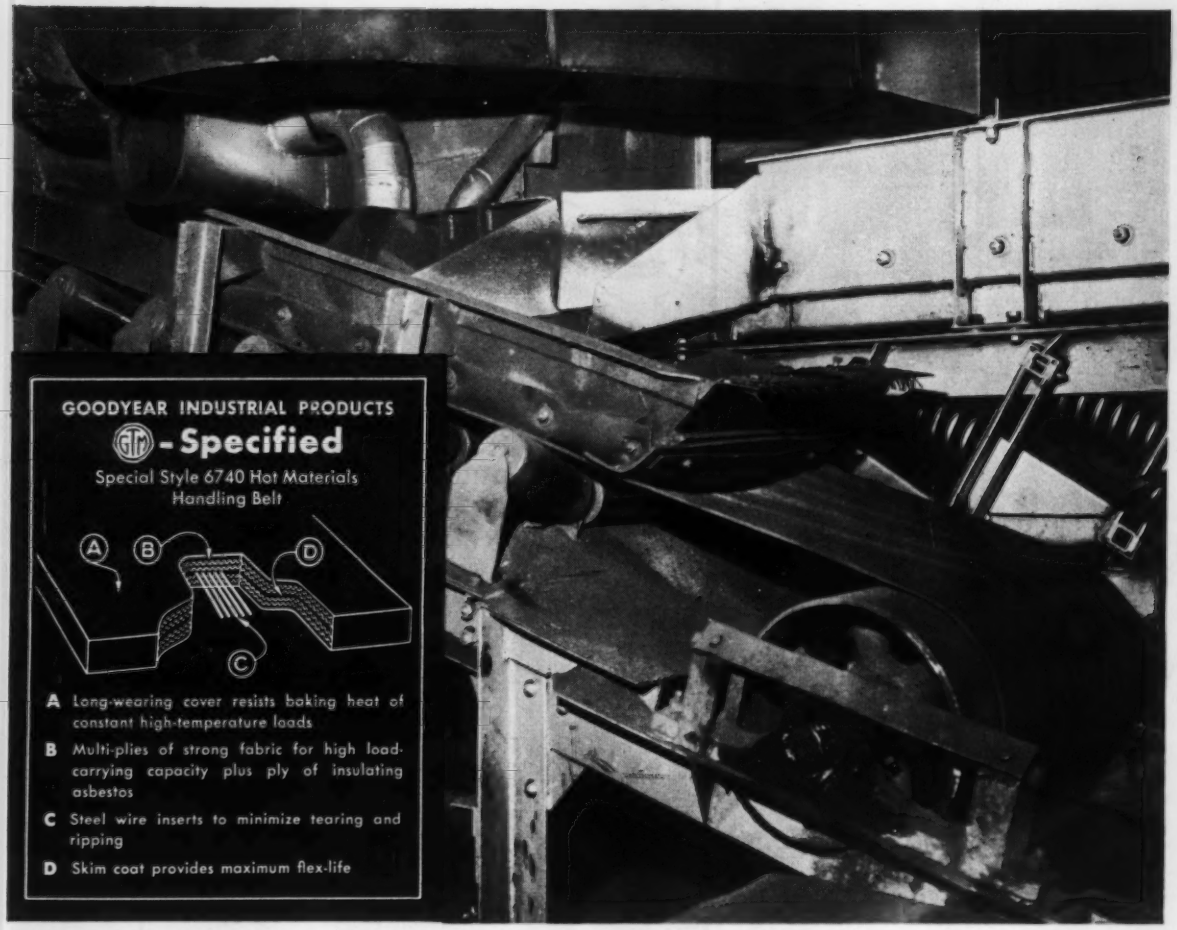
Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, New York


GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
Special Style 6740 Hot Materials Handling Belt
A
B
C
D
A Long-wearing cover resists baking heat of constant high-temperature loads
B Multi-plies of strong fabric for high load-carrying capacity plus ply of insulating asbestos
C Steel wire inserts to minimize tearing and ripping
D Skim coat provides maximum flex-life

G.T.M. Saves $4000/year on shake-out refuse belts

SHARP, hot shot, gates, risers and other scrap quickly tore and burned up refuse-handling belts at this automotive foundry. On the average, the 126′ belts only lasted two months. Usually large patches had to be put in the belt to get even two months' service.

Special, wire-inserted belts (see blueprint) and vulcanized, rather than steel-plate, splices were suggested by the G.T.M.—Goodyear Technical Man. Result: *Service averages six months with $4000 annual savings.*

Your belt or other industrial rubber problems may be similarly solved by the G.T.M. and your Goodyear Distributor. Call them, today! Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

STYLE 6740 CONVEYOR BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

STEEL
The Metalworking Weekly

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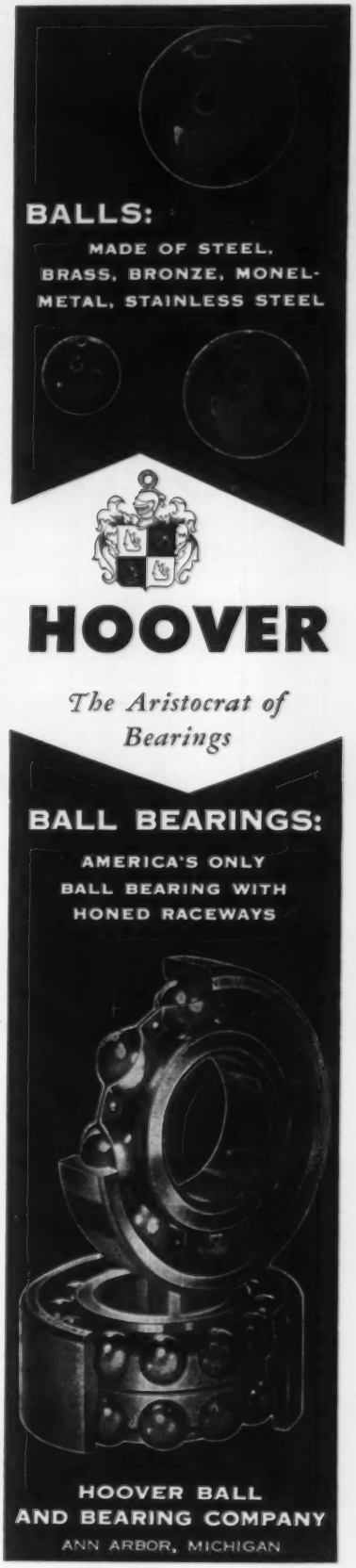


metal can't rust

in easy-to-use

NOX-RUST VAPOR WRAPPER*

*PATENTED

Rust-proof metal parts at savings up to 50% with chemically active Vapor Wrapper. Protective, instant acting, vapors enable you to ship any size product factory fresh, ready for use.

SMALL Nox-Rust Vapor Wrapper provides positive protection for precision parts or instruments.

OR **LARGE** Low-cost, convenient, clean Vapor Wrapper protects huge machines while in storage or in transit.

NEW **HEAT SEALABLE** *Vapor Wrapper* Suitable for automatic or semi-automatic rust-proof packaging of metal parts.

Write on your letterhead to Daubert Chemical Co. for information, Dept. C-21

Protective Packaging Div.

Daubert Chemical Co.
formerly NOX-RUST CHEMICAL CORP.
333 N. Michigan Ave.
Chicago 1, Illinois

Mfrs. of: RUST PREVENTIVES, VCI PAPERS, ADHESIVES, AUTO UNDERCOATINGS

behind the scenes

Deus Ex Machina

Late last May Chicago Editor Erle F. Ross found himself in Texas en route to the Foundry convention at Houston. Never one to pass up an opportunity to visit old friends or to make new ones, Erle figured to light and set a spell with the Lone Star Steel folks.

"You see," he explained, "I was in Lone Star, Tex., and there was a great big steel works sitting there, and the first thing I knew I was shaking hands with the chaplain—"

"How's that, again? Chaplain? Are you sure you aren't mixed up?"

"No, no; that's what I mean. They had a chaplain, and they aimed to build a chapel, and I think there's a good story there. When I get back to Chicago, I'll send you the name of the man you ought to write to."

Ross apparently returned to Chicago by way of Lhassa, Donnegal, Cairo, the Bay of Whales and Stalingrad, because we didn't hear from him again until a few weeks ago. He supplied us with a name and address; we wrote, and received a most cordial reply from L. D. Webster, vice president of the Lone Star Steel Co.

E. B. Germany, president of Lone Star, long believed that faith, hope and charity could flourish just as effectively in a steel plant as they could in a cathedral, so he hired a full-time chaplain, the Rev. James W. Workman. One thing led to another, and one day Mr. Germany submitted to his board of directors a plan for erecting an interdenominational chapel on plant grounds. The undertaking was approved unanimously, and on Friday, Nov. 4, 1955, at 2 p.m., the Lone Star Chapel in the Pines was "opened for prayer and meditation, where all men shall find light for darkness, assurance for confusion and faith for doubt and despair."

Free Speech

Faie A. Hurd, Industrial Distributor Marketing Associates, Chicago, earnestly considered Claude Schaffner's "Looking Backward" notes that appeared in this department on Jan. 16. Mr. Hurd penned some thoughts of his own, but wondered if they would be "too hot to handle."

He submitted: "Discontinue the practice of subsidizing, by our government, unless all contributors to our economy are subject to similar gratuities and guaranties. Make officers of unions responsible for all acts of lawlessness committed against persons or property during strike periods."

Don't see why these should be too hot to handle, Mr. Hurd. They're simply honest opinions of a man who dares to think.

A Clue: Hot Crooks

This might be a good time to catch up on our puzzle corner. We had a card from Purchasing Agent R. T. Phipps, Underwood Co., Bridgeport, Conn., with the words ROAST MULES: SOMERSAULT.

Everybody figured the ciphergrams, but they stumbled over Chief Hmkghlo's number. When Robert Wells, of Great Falls, Mont., ventured a guess of 33, he hesitantly asked if he had overlooked something obvious, like an elephant. That's difficult to answer. The proposition declared that eight, for example, was five. It couldn't have been vice versa, because it stated that five was three. Anyway, the answer that would have saved the missionary was 55. And since nobody came up with it, we must assume that goodly man has long since been reduced to his carbohydrate, protein and caloric equivalent.

Here is a ciphergram reversed to a cryptogram: Each number stands for a letter. Only four of the lines, however, make sense.

```
          1 7 6 5 2 3
          4 8 5 6 6 3
9 0 9 1 5 2 5 7 0 9
          8 7 4 0 3 9
-----------------------
9 0 9 3 0 6 1 9 3 4
```

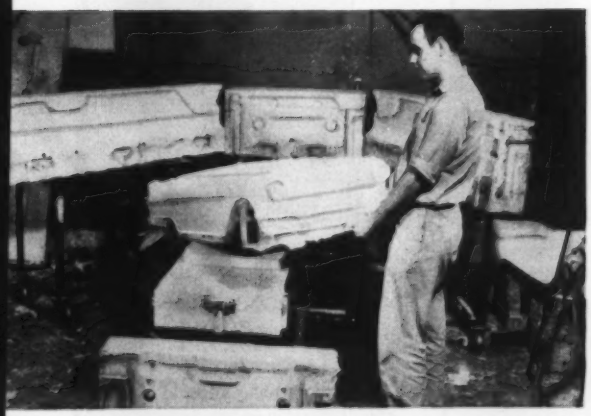
Shrdlu

(Metalworking Outlook—Page 59)

Small-scale sample shows big possibilities in plastic tools

REINFORCED PLASTIC BODY on the "Junior Star Chief" was produced from Rezolin "Toolplastik" compounds, based on BAKELITE Brand Epoxy Resins. The child-sized scaled-down replica of the 1956 Pontiac convertible is used for dealer promotions.

Visit Bakelite Company's Exhibit, Booth #397, at A.S.T.E. Show, Chicago, March 19-23.



FIVE MOLD SECTIONS, shown here with cast body shell, will be clamped together to form complete body mold. These sections and the master model from which they are cast are made of compounds of BAKELITE Epoxy Resins. Dimensional stability of these materials prevents changes in size and shape. Their ability to harden at room temperature without shrinking speeds reduplication. "Toolplastik" compounds used are based on BAKELITE Epoxy Resins and are produced by **Rezolin, Inc.,** Los Angeles 45, Calif.

Where model changes are fast and frequent, metal and plastic products alike can benefit from the advantages of plastic tooling. Liquid compounds based on BAKELITE Brand Epoxy Resins can be cast into shape without pressure, cured at room temperature. Their minimum shrinkage means minimum finishing. Dimensional stability is outstanding; flexural, impact, and compressive strengths, excellent. Light weight makes plastic tools easy to handle. Examples: jigs, spotting racks, and Keller models made from glass cloth—Rezolin "Toolplastik" compounds.

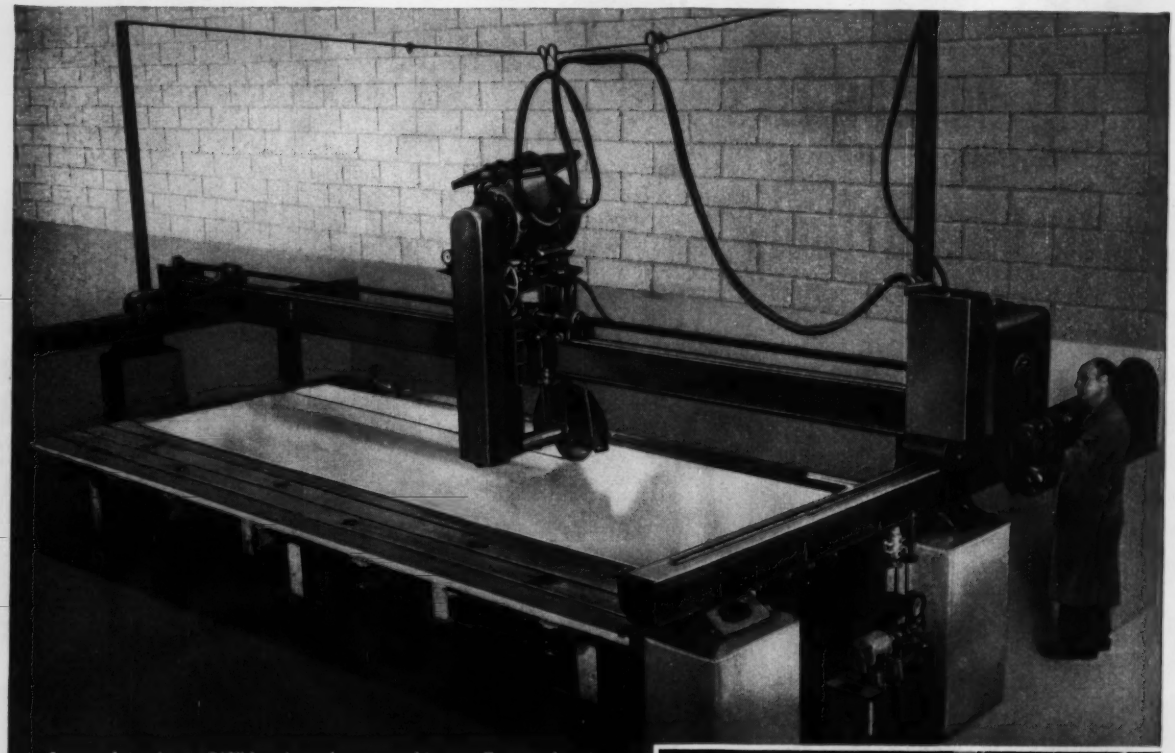
For metal-working . . .

BAKELITE BRAND EPOXY RESINS

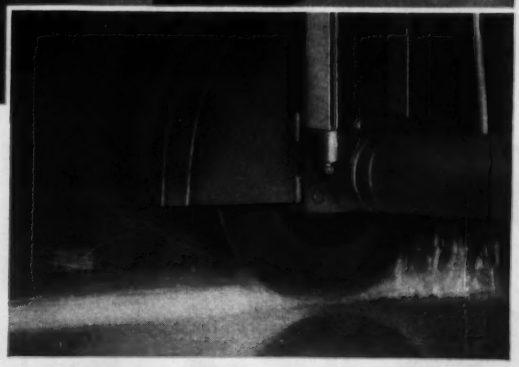
BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

FRASSE INSTALLS HUGE ABRASIVE PLATE SAW...



Large plates (up to 240" long) can be cut on this new Frasse abrasive saw. This means fewer welds . . . lower labor costs . . . and a more saleable product.



This huge new abrasive saw . . . a giant in performance as well as size . . . enables Frasse to cut stainless steel and aluminum plates "to-order" from standard stock sizes. With it, plates up to 240" long can be cut—close tolerances can be kept — and square, smooth edges, suitable for most applications without further finishing, can be obtained.

To the fabricator, this means plate deliveries need no longer bottleneck production . . . inventories can be reduced . . . and edge finishing costs may be cut or wiped out completely, simply by phoning Frasse.

So, for dependable service, quick delivery . . . and a product that can contribute to your profit — depend on Frasse. A *choice* source for your stainless steel and aluminum requirements.

Call FRASSE 1st

For STAINLESS STEEL and ALUMINUM PLATES

Peter A. **FRASSE** and Co., Inc.

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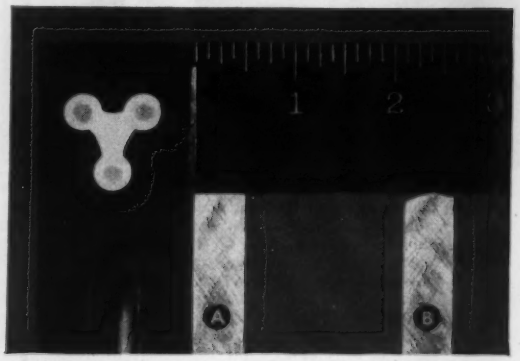
PHILADELPHIA • BUFFALO • SYRACUSE • HARTFORD
LYNDHURST • ROCHESTER • BALTIMORE



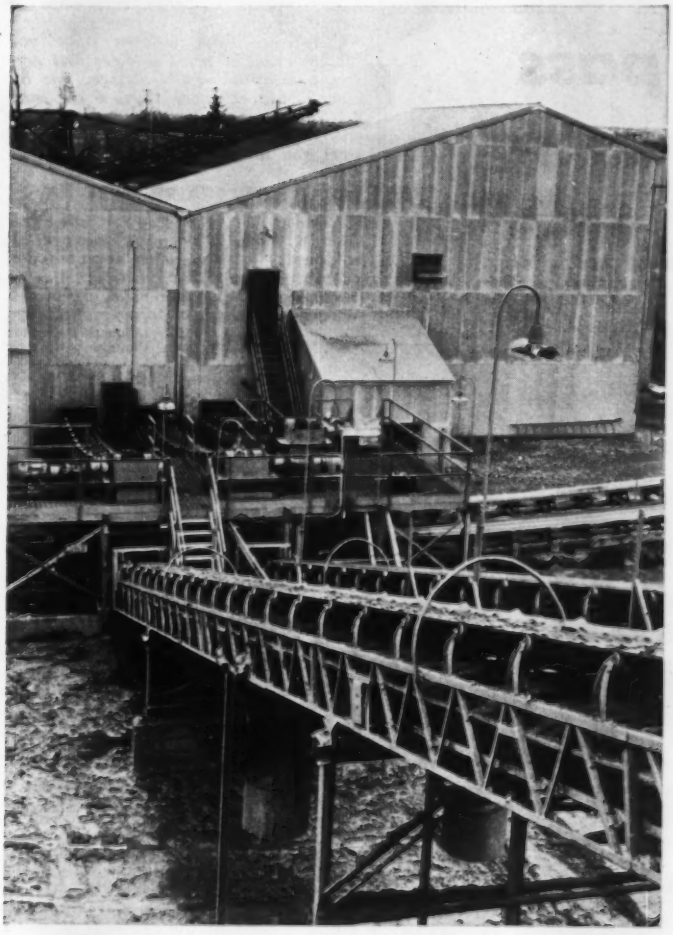
Abrasive cutting offers a superior edge that will in most cases reduce edge finishing costs. Note (a) cut on the new Frasse abrasive saw, (b) cut on a conventional shear.

LOWER COST PER TON-MILE

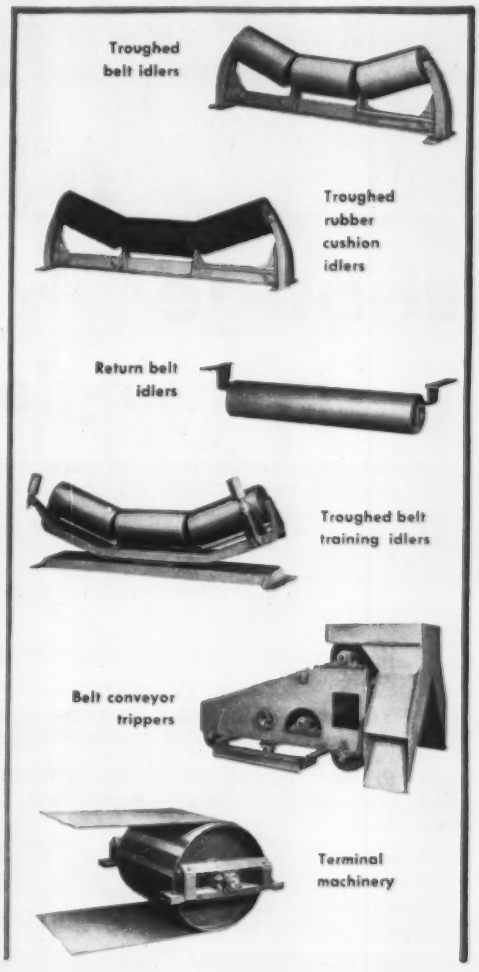
. . . yours with either a Link-Belt single belt conveyor or complete system

WHETHER you need a single belt conveyor or complete system, you'll find that Link-Belt engineering and equipment add up to lower cost per ton mile. Drawing from vast experience, our engineers can develop a system incorporating the most practical components from our complete line of quality idlers, trippers, drives, terminal machinery and other items. And if desired, we will handle erection.

Link-Belt has pioneered the development of belt conveyors for short or long hauls . . . indoor or outdoor service. To learn how this background can produce utmost economy per ton-mile in handling your bulk material, call your Link-Belt office.



Link-Belt 30-in. wide belt conveyors handling iron ore concentrate and tailings from washing plant to railroad and truck loading hoppers.

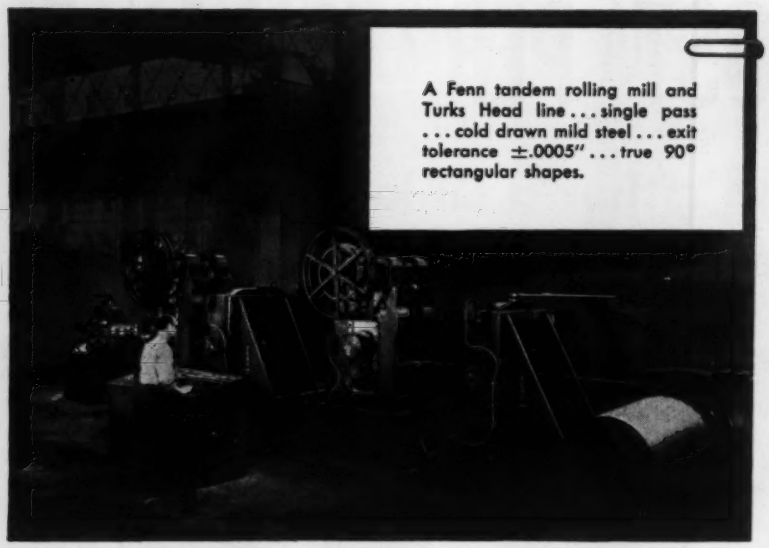


Link-Belt offers you one source for all equipment—including 500 idler sizes in 35 types . . . plus pulleys, drives, trippers and supports. Whatever the weight of loads, atmospheric factors or other operating conditions, you're assured of the easiest and most practical integration of belt conveyors into your overall system requirements.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 15.152



A Fenn tandem rolling mill and Turks Head line . . . single pass . . . cold drawn mild steel . . . exit tolerance ±.0005" . . . true 90° rectangular shapes.

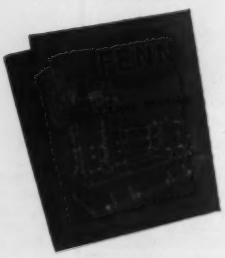
change 1 3/32" to 0.625" × 1.250"

in a single pass

- Can you make these and other shapes from round, in one pass, at speeds up to 2000 fpm?
- Can you hold tolerances of ±.0005" over 500 miles of stock, without regrind of dies or tools?
- Can you make an infinite number of squares and rectangles on the same set of dies?
- Can you make true squares and rectangles with sides 90° from top and bottom?

You can, if you own a Fenn line of equipment, made up of machines selected to suit *your* requirements*.

* Precision Rolling Mills — Turks Heads — Wire Shaping Mills — Swaging Machines — Accessories.



FENN

The Fenn Manufacturing Company • 557 Fenn Road, Newington, Connecticut

How can I save by using your Rolling Mills ☐, Swaging Machines ☐, Turks Heads ☐?

*Name*_____ *Title*_____

*Company*_____

*City*_____ *Zone*_____ *State*_____

LETTERS TO THE EDITORS

Putting Price Index To Work

I am interested in STEEL's Finished Steel Price Index which appears in the market section of STEEL each week.

Most of the materials we use are primary ones. I understand these producers use the Finished Steel Index for their inflation guide. We would appreciate your advising us on how we can use this index as a guide to change our prices when our suppliers change theirs.

Jerry Galvin
President
Jerry Galvin Inc.
Long Island City, N. Y.

• STEEL's *index gives a percentage figure as a measure of the change in base prices only. It does not include extras. Any substantial increases in prices via extras will not be reflected.*

If you want a gage of steel price changes via both base prices and extras, use the price index computed by the U. S. Bureau of Labor Statistics. It is published weekly on the same page as STEEL's *index.*

Composites and indexes show you the direction of price changes and give you a measure of the change. For instance, if steel prices go up 6 per cent, you might want to raise your prices enough to cover the increased cost of steel you use.

Good Coverage of Sales Pay

Your article, "Fair Pay for Salesmen" (Jan. 9, page 27), covers the over-all complexity of the sales compensation problem so well that we would like to circulate it among our sales executives. We would appreciate three copies.

Richard Crampton
Field Personnel Planning & Control
Behr-Manning
Division of Norton Co.
Troy, N. Y.

Protection of Water Supply

I have read your article, "More Work for Water" (Jan. 30, page 84), with interest. I would like copies of it and the companion article, "Dollars Down the Drain" (Feb. 6, page 136).

Would it be permissible for us to reprint these articles? I have in mind a small booklet made up almost entirely of the articles and how they apply to the Connecticut Valley.

As a conservation organization dedicated to the protection of the natural resources of the Connecticut Valley, we are interested in the problem of water supply and water promotion. Our organization is only three years old, but

(Please turn to page 12)

KINNEY MOBILE VACUUM DEGASSER

OFFERS FLEXIBILITY TO MODERN FOUNDRY OPERATION

No one disputes the advantages offered by melts subjected to vacuum degassing. Metallurgical vacuum processing makes possible the superior metals so much in demand today . . . Kinney Mobile Vacuum Degassers make this type of processing both economical . . . and profitable. The MOBILE feature is especially adaptable to existing foundry layouts.

These rugged units are designed to give dependable, trouble-free service while meeting the severest demands of modern foundry operation. Cleaner, higher grade, controlled castings result from improved density and physical characteristics . . . while chemical and gas flushing is eliminated . . . costly impregnation processes are done away with . . . and the utilization of lower grade, secondary metals is permitted.

No special operating skills are required. The vacuum chamber is designed for easy melt control and observation . . . with efficient, rapid pump down to low pressures achieved by a Kinney Model KDH-130 vacuum pump. The pump is effectively gas ballasted to eliminate contamination by water and other condensable vapors. These and many other built-in features make the Kinney unit your best buy in mobile vacuum degassers. Contact or write your nearest Kinney agent for complete data. Kinney Mfg. Division, Boston 30, Massachusetts.

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3841 WASHINGTON STREET • BOSTON 30 • MASS.
INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N.Y.

• Please send Bulletin 402 describing the Kinney Mobile Vacuum Degasser.

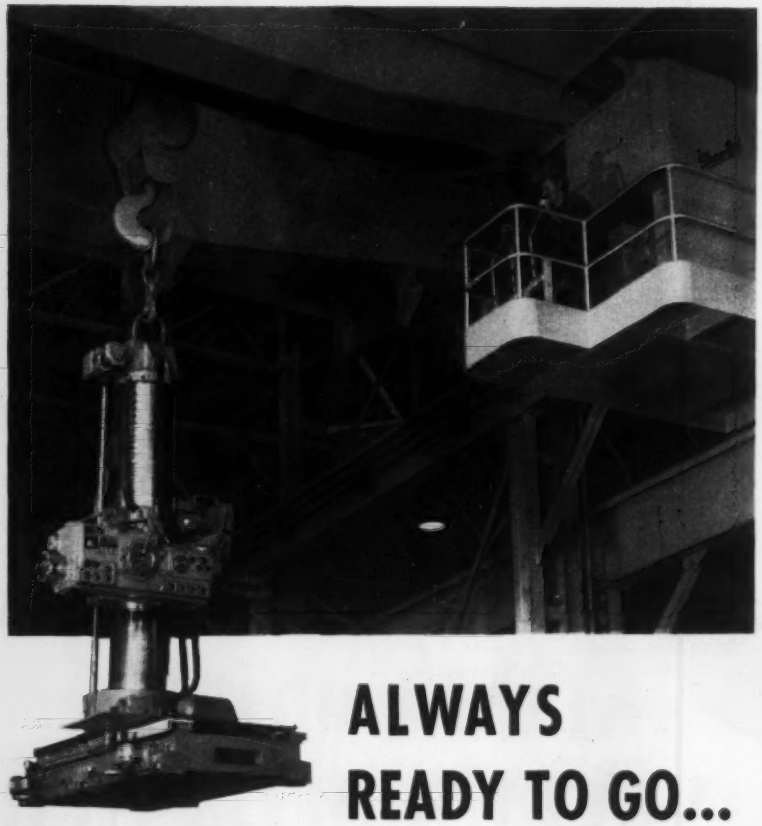
Our vacuum problem involves .....

Name .....

Company .....

Address .....

City ..... *State* .....



ALWAYS READY TO GO...

Only a crane that is "always ready to go" can contribute substantially to profitable plant operations year after year That is why *absolute dependability* tops every other reason why "Shaw-Box" Cranes are favorites the world over.

Every day, in thousands of industrial plants, in railroad shops and power plants, "Shaw-Box" Cranes are demonstrating their enduring stamina. Owners everywhere profit from the plus values in all-around safety, low-cost operation and attention-free performance that are engineered into their "Shaw-Box" Cranes. Many crane construction features and operational advantages now accepted as standard were first introduced by "Shaw-Box". The same creative research is continuing to add more value per purchase dollar to every crane we manufacture.

Today, the complete line of "Shaw-Box" Cranes offers the greatest variety of standard types and sizes available from a single source. Whether your problem is to lift 500-lb. loads or more than 300 tons at a time, learn how to get the best installation, economically. Write for Catalog 219.

"Shaw-Box"® CRANES

MAXWELL MANNING M&M MOORE INC. TRADE MARK

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

LETTERS

(Concluded from page 10)

we feel that tangible steps have been taken to acquaint the people of the Connecticut Valley with today's problems—as well as the serious problems that we must be considering to protect our natural resources and make wise use of them in the future.

E. R. Foster
Executive Director
Connecticut River Watershed Council Inc.
Greenfield, Mass.

• *Permission granted.*

Screen Is Metal, Not Plastic

The item, "Flashproof" in the Technical Outlook column of Jan. 16 (page 67), describes the antiflash screen in our client's new stainless steel faucet, as made of Kel-F plastic. Only the seal ring is made of Kel-F plastic. The screen is metal.

Saul A. Stadtmauer
George Black Co.
Union, N. J.

Get Patent First

I would like to know of some procedure of introducing new ideas or inventions to manufacturers without immediately applying for patents.

Maurice E. Beck
329 Pearl St.
West Lafayette, Ind.

• *The only really safe procedure is to apply for a patent. To protect themselves, many firms won't examine an idea until a patent has been applied for. For instance, a firm's research department may be working on an idea similar to one an inventor brings in. If the firm looks it over, turns it down and then applies for a patent on a similar idea a short time later, the inventor could probably bring suit, even though the firm had developed the idea entirely on its own.*

Fight Against Metal Fatigue

Please send several reprints of the article, "What You Can Do About Metal Fatigue" (Jan. 16, page 68). This summary of the fatigue problem will be a worth-while reference in our design work.

Alexander H. Scott
Mechanical Engineer
Kaiser Aluminum & Chemical Corp.
Mead Works
Spokane

Your article is informative and would solve many problems if followed by industry in general. May I have a reprint and your permission to reproduce the two lists, "How To Fight Fatigue Failure" and "To Avoid Fatigue Failure in Welded Steel Parts . . ."?

Walter Nagell
Manager
Production-Engineering Dept.
Whiting Corp.
Harvey, Ill.

• *Permission granted.*

Users tell you how

These two cut-off wheels top all others

Reports prove Norton rubber bonded R50 and resinoid bonded B9 wheels save on the widest range of wet and dry applications

For wet cutting

Users' reports on how the Norton R50 adds the profit-boosting

"TOUCH of GOLD"

Wheel life tripled — Massachusetts tool manufacturer says R50 wheel, cutting-off high speed steel tap stock, lasted three times as long as best competitive wheel. Job required very smooth cut, with no burr or burn.

Best in every way — Illinois maker of combination doors and windows reports R50 wheel produced best quality cut, fastest cutting action, longest life for cutting extruded aluminum frames.

Longer lasting, superior cutting — Rhode Island oil seal manufacturer reports R50 wheel, cutting-off stainless steel, gave considerably longer life with better quality cut than any other wheel.

70% more durable — New York steel company says R50 wheel beat durability records of two best previous cutting-off wheels by 70%. Work was on high speed and carbon tool steels.

First among four — Pennsylvania manufacturer of coal mine bits reports R50 best wheel used for cutting alloy steel bit stock. Far superior, in quality of cut and durability, to three other wheels tried.

The Norton R50 rubber bonded cut-off wheel is designed especially for wet cutting of ferrous bar stock up to 6" diameter. It is the wheel to use where quality of cut, without burning, is important. Built-in chip clearance — unusual in this type of wheel — is one of many "Touch of Gold" advantages for better cutting performance and longer wheel life.

For dry cutting

Users' reports on how the Norton B9 adds the profit-boosting

"TOUCH of GOLD"

100% more cuts — New Jersey foundry switched to B9 wheels for cutting "Christmas tree" risers from precision castings, after tests in which B9 gave twice as many cuts.

Five times better — California naval shipyard re-orders B9 wheel for aluminum cutting jobs. Reason: B9's 5 to 1 superiority over best previous wheel

Best general purpose wheel — Massachusetts manufacturer of molded rubber products reports the B9 best all-around cut-off wheel in their experience. Chief jobs were cutting various types of steel up to 3" diameter.

Unbeatable on Inconel — Pennsylvania bearings company says it found no other wheels to compare with the B9 for cutting Inconel bar stock. Outperformed competitive wheels on all counts

565 more cuts — Massachusetts manufacturer of textile equipment reports B9 wheel produced 700 cuts on 1 x ½ x ⅛" steel channels. This topped previous wheel's record of 135 cuts by 565 — for five times longer wheel life.

The Norton B9 resinoid bonded cut-off wheel is recommended for high production dry cutting jobs, especially where fast rate of cut is essential. It is made with either smooth sides or the rough "F" sides for more clearance in the cut. It will give you long, economical "Touch of Gold" performance in the widest range of ferrous and non-ferrous applications.

Is wet or dry cutting best for YOU? — Ask your Norton distributor

If your cut-off wheels are performing poorly, or wearing out too rapidly, perhaps you ought to check your methods as well as your wheels. You may, for example, be dry cutting, when wet cutting would be more efficient — or vice versa.

Your Norton Distributor's abrasive specialist or your Norton Abrasive Engineer is always ready to give you plenty of practical information on cut-off *methods* — information that can save you money every day.

See your Distributor soon, or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

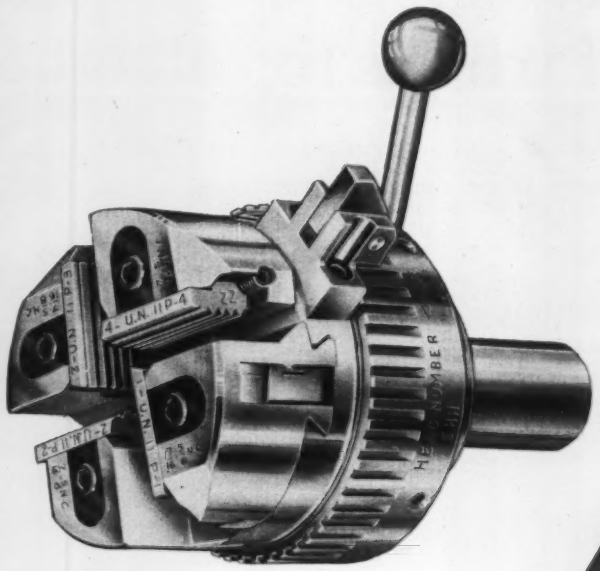
Making better products... to make your products better

W-1602

NORTON

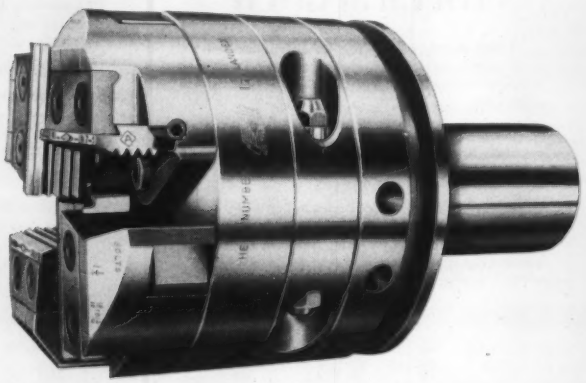
and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes



for Class 4 and 7 tolerances
HARDENED-AND-GROUND Die Heads

2 ..... maximum



for Class 2 and 3 tolerances
HEAT-TREATED Die Heads

LANDIS *Machine* COMPANY
WAYNESBORO • PENNSYLVANIA • U. S. A.

These
THREADING
TOOLS
displayed
at Booth 578
ASTE Show

445-C

styles of LANDIS Die Heads

PRECISION or ECONOMY

"Threading Efficiency" requires the selection of the proper die head for the job to be done, and is the essence of LANDIS design. To ensure that you may use the most efficient threading tool, LANDIS manufactures Die Heads in two basic styles:

HARDENED-AND-GROUND HEADS should be used where a high degree of thread-cutting accuracy is required. Their fundamental design and the inherent qualities of specially selected and hardened materials provide the maximum rigidity necessary for threading to Class 4 and Class 7 tolerances.

HEAT-TREATED HEADS are designed for the utmost economy when doing commercial threading, and will produce threads to Class 2 and 3 fits. The initial cost is small and rugged construction ensures trouble-free operation and few repairs. Wide range coverage requires minimum tool inventories, and along with the use of LANDIS Tangential Chasers allows maximum output per dollar of tool cost.

LANDIS Tangential Chasers are an important factor both in the economy and precision of these basic head styles. These chasers may be replaced or reground singly, will thread all diameters of the same pitch and form, and can be used for 80% of their original length. Their basic design minimizes stress and distortion, and allows either style of die head to produce threads of the accuracy for which it is recommended.

LANDIS manufactures more than 100 sizes and styles of standard and special Die Heads for use on threading machines, turret lathes, tapping machines and bar automatics. Let us suggest the Head most suitable for *your* needs—send specifications and ask for Bulletins F-80 and F-90.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT - CUTTING - TAPPING - GRINDING - ROLLING

448-C

Whether we "NEED IT OR NOT"

Frank Sorensen, Jr.

TREASURER, THE CINCINNATI GEAR CO.

In one way we're a little like the old-timer who religiously took a bath every Saturday—whether he 'needed it or not.' We take somewhat the same attitude towards the replacement of our gear manufacturing equipment. We purchase new equipment and tools and retire old machines on a regular calendar basis, even though the old ones may seem adequate for further use. It is all too easy to slip into the habit of putting off purchase of a new unit because the old one still has "lots of use left in it," or is still "relatively" efficient. By prodding ourselves into the purchase of new equipment on a 'schedule' we have avoided this pitfall, and today we have as modern and efficient gear manufacturing facilities as any in the industry. Even our factory buildings (have you ever seen our plant?) reflect this constant striving for the better and the more efficient—for our present plant, built in 1942, replaced a plant that then was a relatively modern installation.

Just as the fellow who took the Saturday night bath was not out of step with the world 50 or 75 years ago, neither was the firm who bought their production machinery "to last." Today, however, the march of technological progress has become so fast and so relentless that we cannot afford to be content with what we have; an aggressive modernization policy is a *must*. We've built up a reputation for producing the best in custom gears, and for producing them efficiently—and we intend to keep that reputation in years to come.

THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

"Gears—Good Gears Only"

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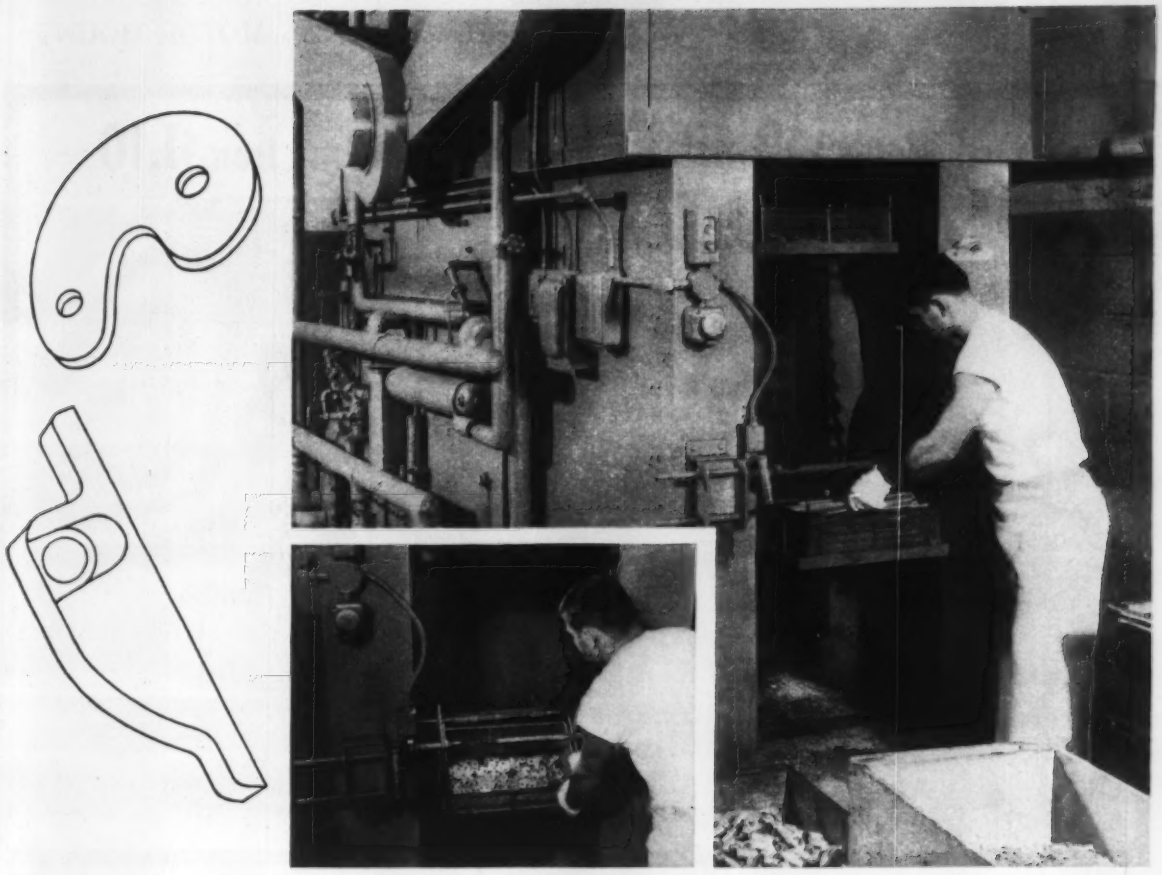


CONVEYORIZED DEGREASER at Standard-Thomson Corp. is loaded by operator.

THOROUGHLY CLEANED with "TRICLENE" D in a single operation, parts are taken from the degreaser.

Standard-Thomson Corp. reports: "TRICLENE® D eliminates solvent-control worries...cuts degreasing costs"

Says George Mitchell, Chief Chemist

"We started using 'TRICLENE' D trichlorethylene over a year ago, and since then we haven't had a single concern about solvent condition. Our only control procedure is a pH check once a month, and we've noticed a reduction in rejects due to etching and staining."

Standard-Thomson, Dayton, Ohio, manufactures a variety of building hardware, automobile and aircraft accessories. They operate four vapor degreasers—three manual and one conveyorized. Since changing to "TRICLENE" D they've been able to eliminate bright dipping of brass parts, and have increased the time between degreaser cleanouts from two weeks to six weeks.

An exclusive combination of locked-in stabilizers gives "TRICLENE" D unequaled resistance to all major causes of solvent deterioration—heat, light, air, acids and aluminum chlorides. Yet Du Pont's rugged solvent contains no salt-forming inhibitors to stain or etch precision-machined parts. Even after repeated use and distillation, "TRICLENE" D retains its original high purity . . . continues giving efficient, trouble-free cleaning of any metal, job after job. And remember, it costs no more than ordinary solvents!

FOR MORE INFORMATION on "TRICLENE"D trichlorethylene, write to the nearest district office of E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

DU PONT

REG. U. S. PAT. OFF.

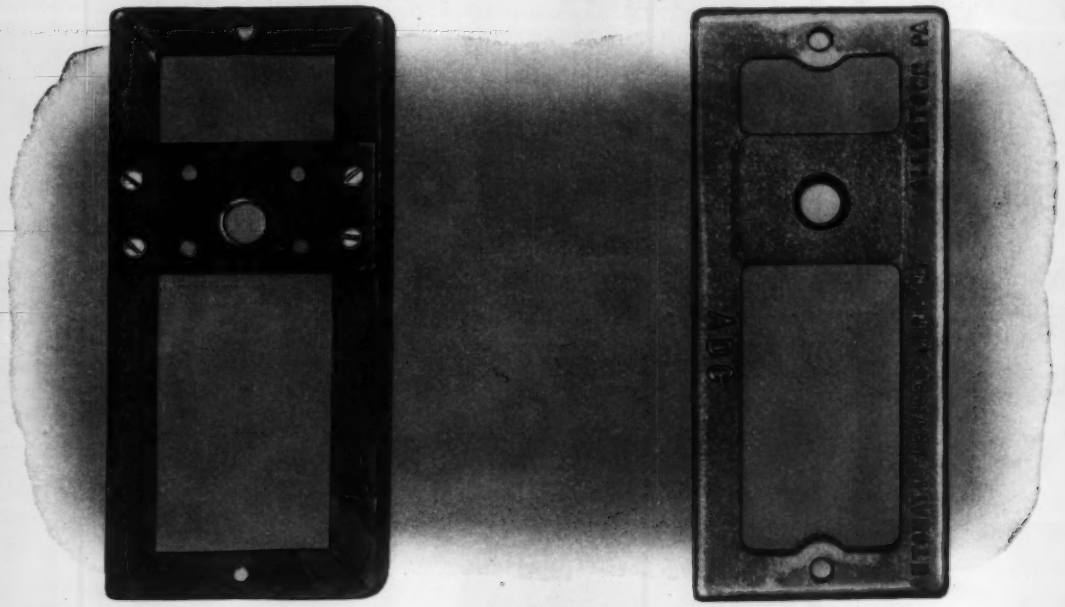
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

TRICLENE® D

TRICHLORETHYLENE

Cost Welded $2.40

Cost in Gray Iron $1.10



Which Would You Buy?

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

Besides saving over 50% on the cost of this motor mount, the Gray Iron casting provides greater rigidity, and better appearance. The casting process also provides a simple means for manufacturer identification. Obviously, Gray Iron is the better buy.

A quick look at *your* products will uncover applications where time-tested Gray Iron can improve your products and reduce your costs.

Review the features of Gray Iron—durability . . . vibration absorption . . . noise elimination . . . rigidity . . . heat and corrosion resistance . . . low notch sensitivity . . . wide strength range. These advantages, plus dollar *savings*, make it worth your while to think of Gray Iron *first*.

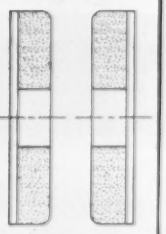
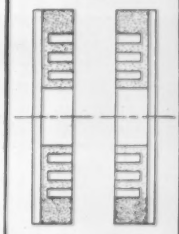
For specific technical or business information about Gray Iron, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

GRAY IRON FOUNDERS' SOCIETY

Disc life increased by 50%

Combination grade Gardner discs cut down time remove more metal per disc

Double disc grinding of small coil springs caused "bell-mouthing" of discs, low production, excessive dressing . . . . Gardner Abrasive Specialist recommended combination grade disc with smooth outer face of harder grade and deep corrugated inner surface of softer grade. The harder outside section resists wear, results in greater stock removal, longer life, fewer dressings.

Former Method single grade discs	Gardner Method combination grade discs
	
Disc Life 228 hrs.	Disc Life 340 hrs.
Dressings 187	Dressings 150
Stock Removed 852 lbs.	Stock Removed 982 lbs.

Softer grade with deep corrugations for rapid chip clearance

Harder Grade Smooth section for shear cut and uniform wear

GARDNER

abrasive discs

BELOIT, WISCONSIN

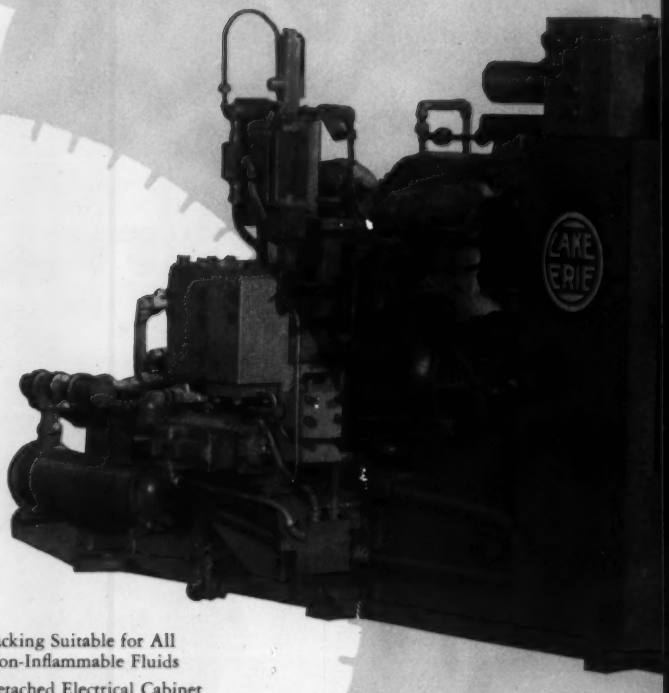
NOW... *A Die Casting Machine that*

EXPANDS WITH YOUR NEEDS

- Available in capacities of 250, 450, 650 and 850 tons.
- Hot chamber or cold chamber models as desired.
- All models are equipped with an improved version of the highly successful Wedge Cam Toggle. The incorporation of knuckled joints eliminates the use of pressure pins when under locking pressure.

by LAKE ERIE ENGINEERING CORP. BUFFALO, N.Y. U.S.A.

LAKE ERIE®



TODAY...

- Buy the unique Lake Erie Series D "expandable" Die Casting Machine as a basic tool with only the essentials required for your present production. This saves money . . . yet gives you rugged characteristics and top quality never before obtainable in a simplified machine. Incorporated in all models of the new Series D are:

- Larger Die Area
- Low-Stressed Tie Bars
- Faster, Smoother, Die Closing
- Lower Frame — Engineered Working Height
- Manifold Valving
- New Knuckled, Wedge Cam Toggle
- Simplified Electrical & Hydraulic Systems
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- Detached Electrical Cabinet
- Reserve Pumping Capacity
- Mechanical Ejection
- Automatic Lubrication

OPTIONAL EQUIPMENT

- Safety Hook
- Screw for Die Height Adjustment

TOMORROW...

As you get into different types of production, you add any of the following features you need. They can be installed fast, at low cost, right in your plant.

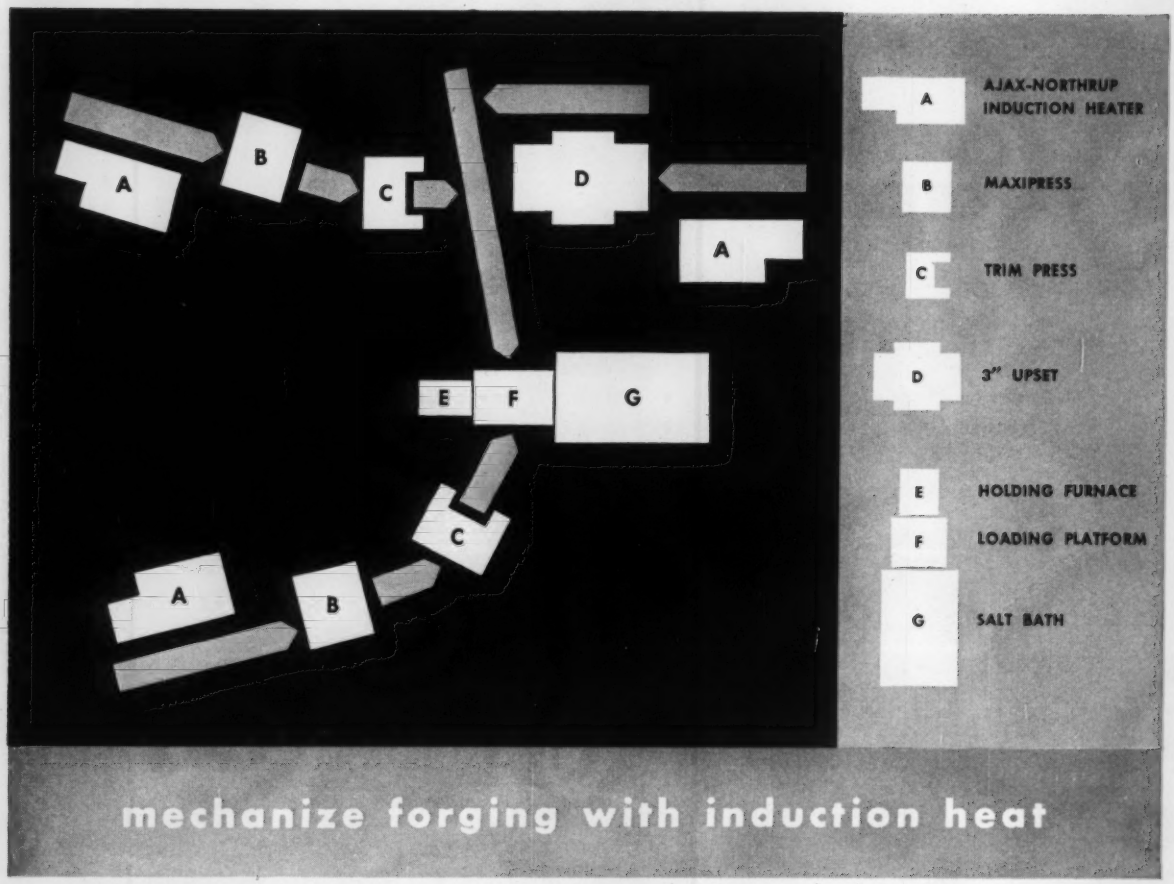
- Multiple Corepull Valving
- Patented "Pressure-Pac" Injection System for Aluminum
- Hydraulic Ejector
- Safety Shield
- Die Cooling System
- Thermostatic Control of Water
- Power Unit Covers
- Positive Adjustable Cylinder Stops
- Vacuum Die Evacuation System
- Cold Chamber Plunger Assembly
- Hot Chamber Furnace Controls

WRITE FOR DETAILS

Send today for Circular 255 describing this new and unusual "expandable" Die Casting Machine.

LAKE ERIE ENGINEERING CORPORATION

882 Woodward Avenue, Buffalo 17, N. Y.



mechanize forging with induction heat

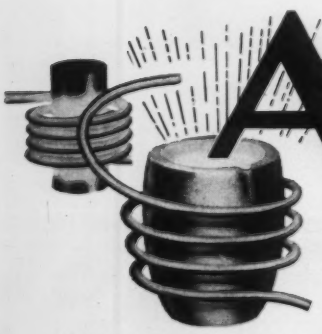
Versatility made Ajax induction heating a natural choice for Massey-Harris' mechanized forge. This one shop handles all the common forging steels, in blanks ranging from one inch rounds to four inch squares, used to make a hundred different automotive and tractor parts. Imaginative forge design, plus the inherent flexibility of Ajax induction heating, make it possible to operate the entire forge with just three induction units . . . each equipped with seven heating fixtures.

The seven fixtures to be used for any given piece can be withdrawn quickly and easily from a "library" adjacent to the forge. Here more than one hundred Ajax-Northrup heating fixtures are completely catalogued and filed in terms of the piece for which they were designed. And the relatively low cost of the fixtures permits Massey-Harris to keep sixty "spares" on hand.

The unusual versatility of this induction heater library is the key to forge mechanization. But Ajax induction heating goes on to pay its way through numerous other advantages. Compared with fuel-fired equipment, for example, induction heating requires less steel, less heating time. There's less scale, dies last longer, rejects are fewer, and working conditions are far better.

Is it any wonder that more forges every day—mechanized or not—are turning to Ajax induction heat? Write Ajax Electrothermic Corporation, Trenton 5, New Jersey, requesting Bulletin 27-B.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

CALENDAR
OF MEETINGS

Feb. 20-22, Association of Iron & Steel Engineers: West Coast meeting, Hotel Statler, Los Angeles. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Feb. 26-29, American Institute of Chemical Engineers: Winter meeting, Hotel Statler, Los Angeles. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Feb. 27-29, American Management Association: Annual electronics conference and exhibit, Hotel Commodore, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: J. O. Rice.

Feb. 27-Mar. 2, American Society for Testing Materials: Committee week, Hotel Statler, Buffalo. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Mar. 5-8, Instrument Society of America, Pittsburgh section: Conference on instrumentation for the iron and steel industry, Hotel Webster Hall and Mellon Institute of Industrial Research. Society's address: 845 Ridge Ave., Pittsburgh 12, Pa. Secretary: Fred Marton.

Mar. 6-8, Society of Automotive Engineers Inc.: National passenger car, body and materials meeting, Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Mar. 11-14, National Association of Waste Material Dealers Inc.: Annual meeting, Waldorf-Astoria, New York. Association's address: 271 Madison Ave., New York 16, N. Y. Managing director: Clinton M. White.

Mar. 12-14, International Acetylene Association: Annual meeting, Hotel Statler, Los Angeles. Association's address: 30 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

Mar. 12-15, National Electrical Manufacturers Association: Mid-winter meeting, Edgewater Beach hotel, Chicago. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Mar. 12-16, National Association of Corrosion Engineers: Annual meeting and exhibit, Hotel Statler, New York. Association's address: 1061 M & M Bldg., Houston 2, Tex. Executive secretary: A. B. Campbell.

Mar. 13-15, Radio-Electronics-Television Manufacturers Association: Spring meeting, Biltmore hotel, New York. Association's address: 777 14th St. N. W., Washington 5, D. C. Secretary: James D. Secrest.

Mar. 14-16, American Society of Mechanical Engineers: Aviation conference, Hotel Statler, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 14-16, Pressed Metal Institute: Annual Spring technical meeting, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Shaker Heights, O. Managing director: H. A. Daschner.

Mar. 18-20, American Machine Tool Distributors Association: Spring meeting, Hotel Statler, Detroit. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

Mar. 19-20, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland, O. Executive vice president: F. Kermit Donaldson.

Mar. 19-21, American Society of Mechanical Engineers: Spring meeting, Multnomah hotel, Portland, Ore. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 19-21, Society of Automotive Engineers Inc.: National production meeting and forum, Hotel Statler, Cleveland. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Mar. 19-23, American Society of Tool Engineers: Industrial exposition and annual convention, International Amphitheatre and Conrad Hilton hotel, Chicago. Society's address: 10700 Puritan Ave., Detroit, Mich. Executive secretary: Harry E. Conrad.

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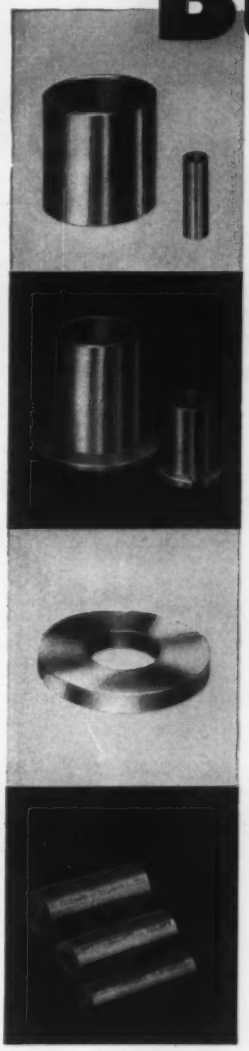

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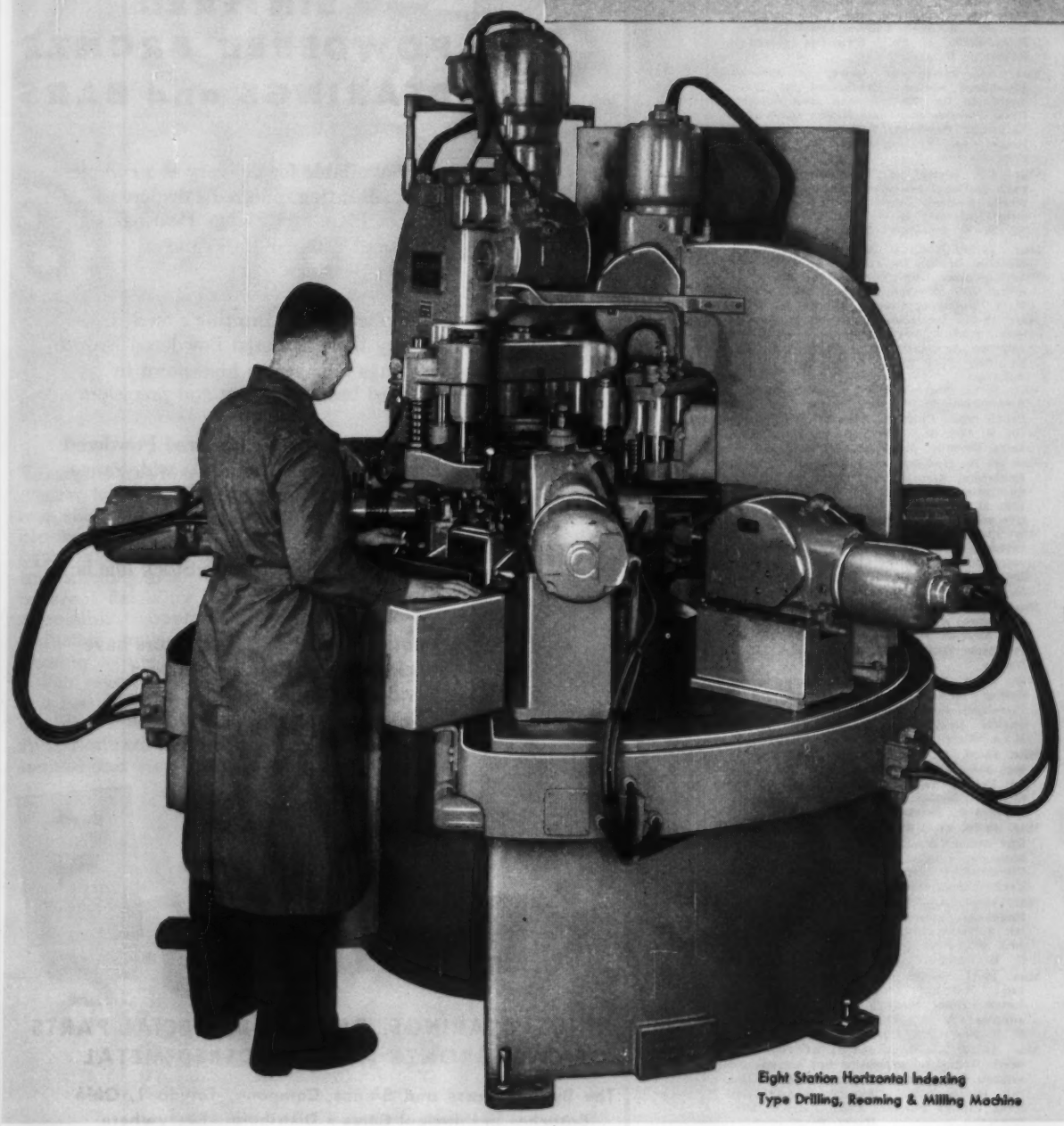
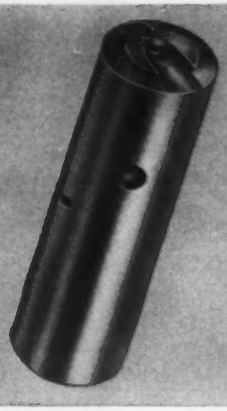
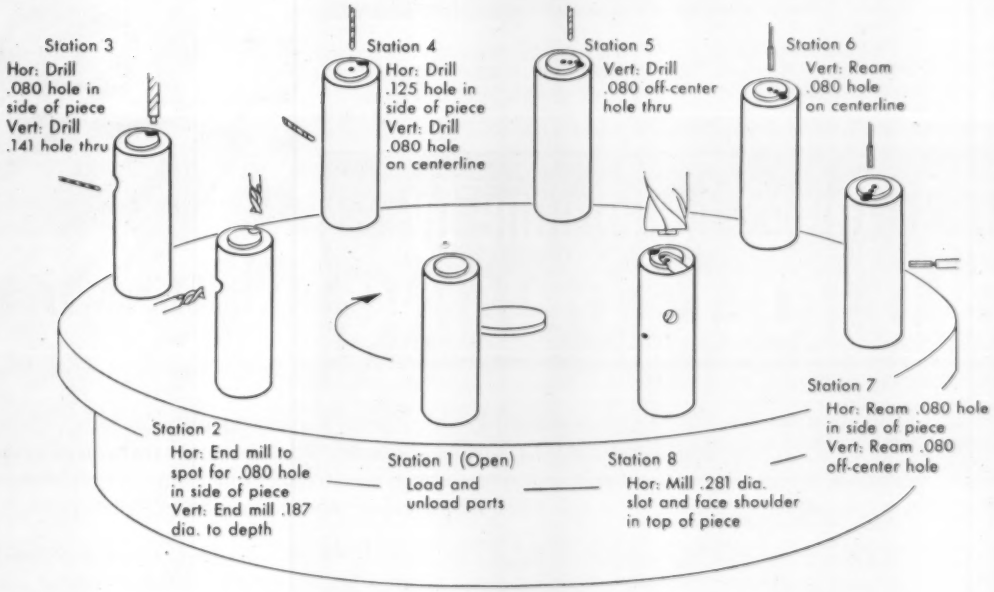


Eight Station Horizontal Indexing
Type Drilling, Reaming & Milling Machine

PRODUCTION MACHINE 1100 operations per hour on intricate gun parts



11 spindles working simultaneously in this 8 station automatic power indexing machine provide manufacturer with highest part quality on a high volume basis. Another example of better products at lower cost through better methods.


Station 3
Hor: Drill .080 hole in side of piece
Vert: Drill .141 hole thru
Station 4
Hor: Drill .125 hole in side of piece
Vert: Drill .080 hole on centerline
Station 5
Vert: Drill .080 off-center hole thru
Station 6
Vert: Ream .080 hole on centerline
Station 7
Hor: Ream .080 hole in side of piece
Vert: Ream .080 off-center hole
Station 2
Hor: End mill to spot for .080 hole in side of piece
Vert: End mill .187 dia. to depth
Station 1 (Open)
Load and unload parts
Station 8
Hor: Mill .281 dia. slot and face shoulder in top of piece

Designing and building automatic production machines like this are a "Hartford" specialty. The use of *standard* machine components — mechanical and hydraulic drill units, machine bases, power operated indexing tables — means lower cost to you. The skill and experience of our engineers results in dependable higher production. Consider this combination for *your* parts processing problem.

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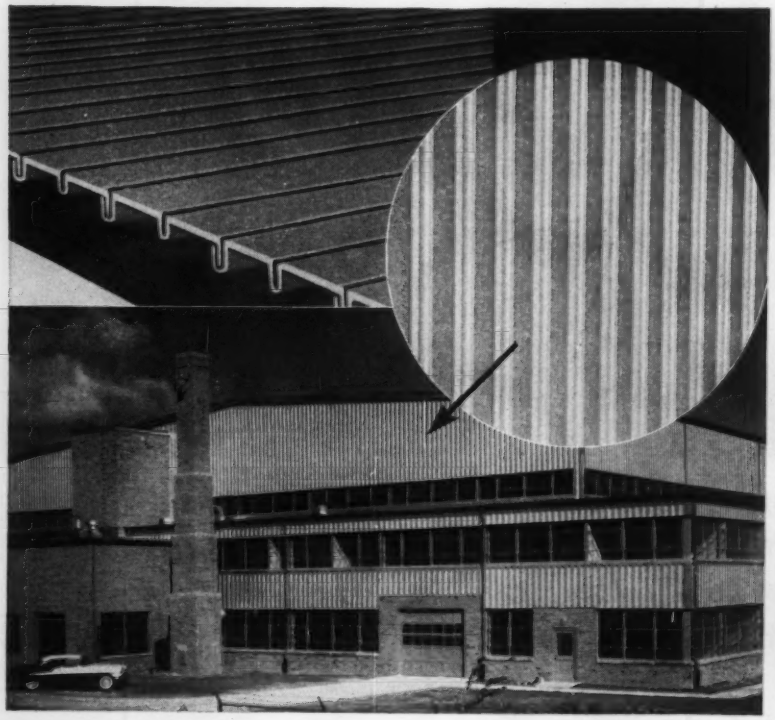
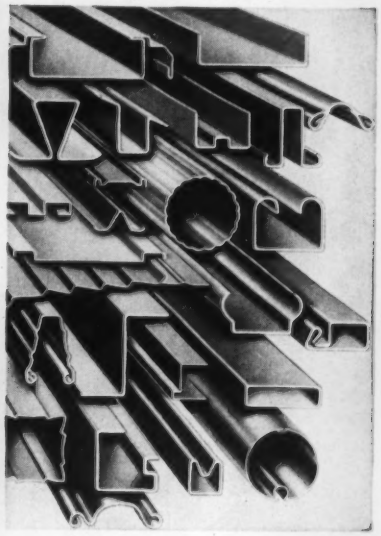


(TOP) *Cross-section of cold-roll-formed Roof Deck by Walker Supply & Mfg. Co., Ecorse, Michigan.*

(INSET CIRCLE) *Aluminum siding panels, (made by Walker Supply & Mfg. Co.) give fine architectural effect.*

Elevator Door, Casing and Trim, by Dahlstrom Metallic Door Co., Jamestown, N. Y.



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The Yoder Book on Cold-Roll Forming contains numerous illustrations with information on the economic and mechanical possibilities of cold-roll forming, the machines and the tooling. Yoder has long been looked up to as the leader in designing and building all such equipment. A copy of the book is yours for the asking.

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DESIGNING WITH ALUMINUM

NO. 17

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

REDESIGNING FROM STEEL TO ALUMINUM SHEET

The development of versatile, high-strength aluminum alloys has enabled many manufacturers to convert their metal products to aluminum from other materials.

Redesign is not complicated, and tremendous improvements often may be gained by application of aluminum. Advantages include easy forming, greater facility of handling, lower shipping costs, longer service life, elimination of need for paint and other protective coating, reduced maintenance and more attractive appearance, along with other desirable features.

Among the especially striking applications in which aluminum parts may be introduced are those involving the redesign of sheet steel products into aluminum. ("Sheet" materials in both metals are those up to .249" in thickness.)

This process requires no more than ordinary design acquaintance with the physical and mechanical properties of aluminum alloys. Aluminum may be formed and joined by any of the familiar methods for metal fabrication, and by a number of other dependable means that most other metals do not accept readily. For example, deep cup-shaped parts may be made in one piece accurately and to finished dimensions without joints from aluminum by impact extrusion or spinning. Such parts are made from steel by expensive forming or hot forging processes followed by final machining and forming of body and base components.

Another simple forming method that is accepted by few metals other than aluminum is "stretch forming," in which the aluminum sheet is stretched over a male die, and provides three-dimensional contours of considerable dimensional accuracy.

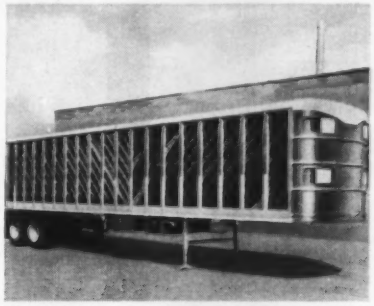
Built-up Structures

Where structures are built-up from several sheet metal pieces, aluminum may be joined by stitching, stapling, adhesive bonding and other quick-assembly methods. These have a very distinct advantage over the more expensive and time-consuming assembly procedures suitable for steel sheeting. For this reason, designing with aluminum sheet materials very often offers important savings in manufacturing costs plus the functional advantages of the finished aluminum parts.

Sheet products generally fall into two classes; load-bearing parts and comparatively unstressed parts. Sheet pieces and assemblies of the latter sort include covers, hoods, ducts, light housings and similar parts that are expected to carry only their own weight plus the nominal pressure of ordinary handling and wear. Such parts often are designed successfully by the experienced designer's "rule of thumb" with no detailed stress analysis made or required.

Designing Unstressed Aluminum Pieces

When designing these comparatively unstressed aluminum pieces and assemblies as replacement for steel, designers need consider only the comparative stiffnesses (elastic moduli) of the two metals. Calculations have shown that an aluminum sheet 42% thicker than one of steel will have approximately an equal stiffness and dent resistance.



Livestock trailer designed by Kaiser Aluminum with modifications by Wilson Trailer Company shows extensive use of stressed aluminum sheet components.

Thus, if the design of a sheet steel hood, cover, enclosure or similar unstressed unit has been calculated as adequate, it may be replaced in aluminum simply by an increase in sheet thickness of less than one-half. Even with the thickness increase, weight will be reduced by more than one-half.

It must be remembered that some sheet metal parts of this nature are constructed according to a designer's personal inclination, calling for some arbitrary minimum of metal gauge, regardless of whether the product's end use will call for such rigidity. Where this has been done, the replacement aluminum sheet often may be no thicker than the steel, or in any case may be of a gauge increase less than the prescribed 42%. This is especially true of smaller parts where the "l/r" ratio of gauge to span is favorable. In such cases, manufacturing costs may be reduced further by actual stress investigation of the parts. The same principles, of course, may be applied in designing stressed aluminum sheet members.

Designing Loaded Aluminum Pieces

Loaded sheet-metal members are found in many design applications. They are used as chutes and guides, as table-type surfaces, as webbing in composite beams and frame structures, in the form of tank shells, and in a multitude of other components where the characteristics of sheet are desirable. The strength and durability of aluminum sheet in such applications are remarkable. For example, a 13′ x 8′ truck platform frame, designed in aluminum sheet materials as a counterpart of a steel assembly, has been found to weigh only 144 pounds—one-third the weight of the steel frame. This formed aluminum sheet structure accepts compression from a 22,500 lb. axle loading, while offering a safety factor of 4½ over the ultimate strength of its metal. Similarly, an all-aluminum livestock transport trailer (see illustration), designed by Kaiser Aluminum with modifications by Wilson Trailer Co. to meet special operating conditions, shows numerous applications of stressed aluminum sheet and weighs some 2800 lbs. less than comparable equipment of ordinary materials. The structural qualities of aluminum sheet materials have been proved in many other industrial applications as well.

Design of Stressed Aluminum Pieces

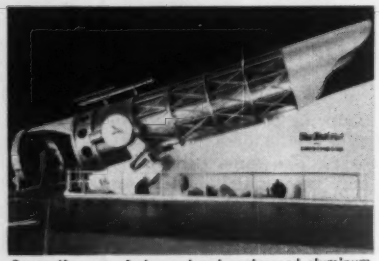
Redesign in aluminum of stressed steel sheet members will pose no difficulty to designers who are familiar with the basic rules for computing structural strength. Aluminum alloys have a modulus of elasticity established as 10,300,000 psi, as compared with a modulus of about 29,000,000 for structural steel. The relative stiffness characteristics of the two metals, then, are in the proportion of 29,000,000/10,300,000, or (approximately) 2.8 to 1. It will be recalled that the rigidity of a section increases as the cube of its depth. For this the stressed aluminum sheet dimension need be increased by only the prescribed 42%, so as to equal its steel counterpart in stiffness.

CONTINUED ON NEXT PAGE

(Advertisement)

DESIGNING WITH ALUMINUM Cont.

Most materials, including aluminum, tend to lose strength as their temperature rises. Aluminum offers a valuable measure of safety against this effect because of its high conductivity and specific heat. The specific heat of aluminum alloys permits them to absorb approximately twice as much heat energy as



Decorative use of stressed and unstressed aluminum sheet at Kaiser Aluminum exhibit at Disneyland.

steel before reaching a given temperature. In addition, the capacity of aluminum to carry heat away from the point of application is about four times that of steel alloys. This resistance to temperature rise and the rapid distribution of heat energy often enables aluminum structures to operate successfully in above-normal temperature conditions.

This resistance to above-normal temperatures extends not only to strength characteristics, but to corrosion-vulnerability as well. The increased tendency of steel to rust in elevated temperatures is familiar to anyone who has observed the appearance of ferrous parts in and around above-normal temperature processes. Accelerated oxidation may be combatted in steel only by means of carefully applied and maintained protective coatings. Aluminum members, protected by their own self-produced film of oxide, are much less subject to attack and require no such intensive maintenance measures.

In many applications, the use of a machine or structure is subject to regulations imposed by law or by advisory bodies. For purposes of this nature the light weight, heat-resistant, non-sparking qualities of aluminum alloys have been accepted enthusiastically, and rules for their design have been established.

For example, where aluminum sheet is to be applied as a replacement for steel in cargo tank trucks for carrying petroleum products and corrosive liquids, the Interstate Commerce Commission has provided a formula to be used in determining the equivalent gauge for materials other than steel.

This formula is:

$$A = B\,x^3\sqrt{\frac{3 \times 10^7}{C}}$$

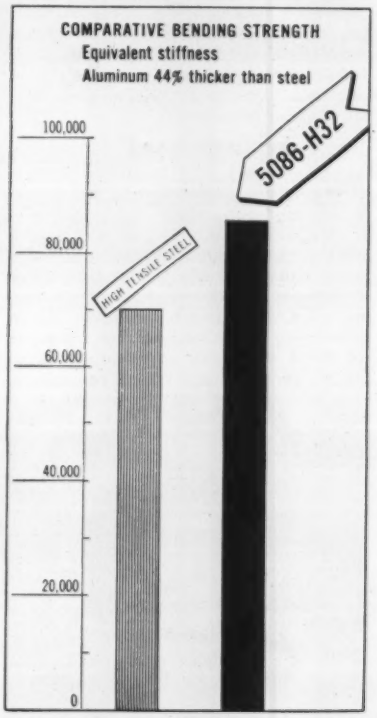
A means — Thickness for materials other than steel

B means — Steel thickness

C means — modulus of elasticity of the alternate material

A 6000-gallon aluminum semi-trailer transport tank, 5' 8" in diameter, designed by Kaiser Aluminum in accordance with these regulations, is self-supporting for a span of 26 feet between kingpin and center of rear tandem. Its construction is of aluminum sheet only .156" in thickness below the tank center line and .125" thick above.

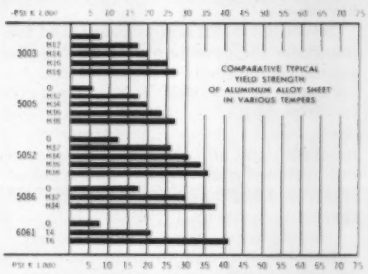
This unit permits a tremendously increased payload, with the additional features of a cooler cargo because of higher sun-heat reflectivity, and a much greater capacity to disperse heat from defective brakes or similar sources of danger. It typifies the advantages gained by use of sheet aluminum in appropriate applications.



HIGHEST BENDING STRENGTH

Designers seeking to take advantage of these superior metal characteristics will find a great variety of aluminum sheet types available. Diversities of alloy, temper and cladding provide aluminum sheet material for almost any purpose. Yield strengths of aluminum sheets range from about 5000 psi in the pure, untreated materials to about 75,000 psi in heat treatable alloys. The latter figure will be recognized by designers as superior to that of many steels. Yield strengths in the neighborhood of 20,000 to 30,000 psi are common to many alloys, with only moderate hardening treatments.

Frequently, the designer in aluminum encounters applications in which he would prefer to use a basic metal of high strength, but with a surface offering especially high resistance to corrosion. For such purpose, "clad" aluminum materials have been developed and are widely used. These sheets are prepared by rolling together the desired alloys to create a dependable and permanent bond. Aluminum sheeting may be clad both sides, and may be obtained clad on one side only by special inquiry, and is offered in both flat and tubular forms.



For applying decorative effects to aluminum parts, many and varied finishing processes have been developed. Perhaps the best known is anodizing, an electrical treatment by which a film of oxide is formed suitable for dyeing in a wide range of colors. Electroplating with other metals may be applied readily, as may numerous types of chemical etching and coating. Satin finishes and other soft-reflection surfaces may be attained by mechanical abrasion or tumbling. For irregularly shaped pieces, difficult to finish by ordinary means, an electro-brightening process removes surface impurities and brightens the overall effect. Paints, lacquers and varnishes may easily be applied to properly prepared aluminum surfaces, which thereafter will not be stained or discolored, as from rusting steel.

These improvements in function, appearance and manufacturing costs have been applied to metal products in many fields by the use of aluminum. More detailed assistance with design, alloy selection and fabrication procedures are obtainable through the Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office:* Palmolive Bldg., 919 North Michigan Avenue, Chicago 11, Ill. *Executive Office:* 7576 Kaiser Bldg., Oakland 12, Calif.

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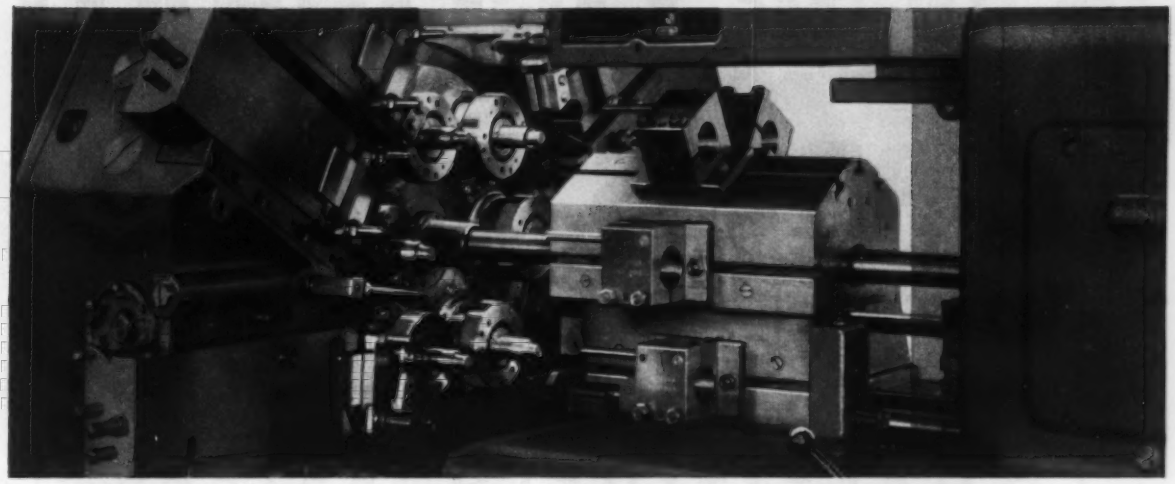

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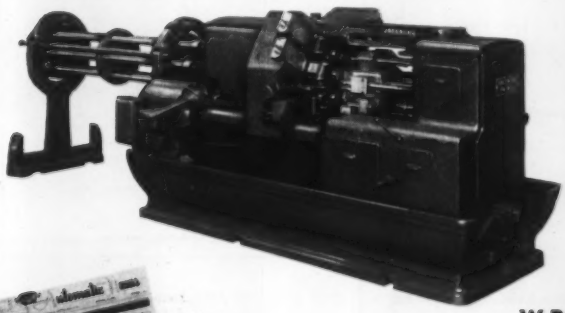

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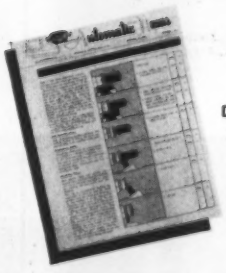

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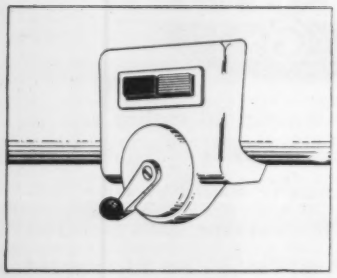
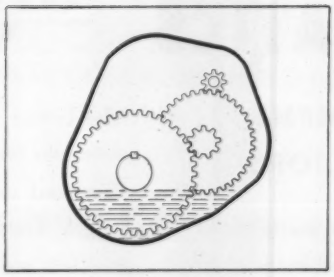
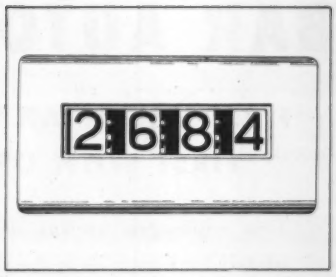


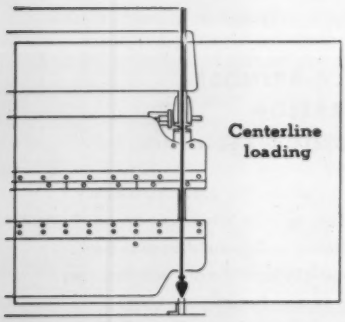
Front controlled, variable speed drive, 20 to 50 strokes per minute.



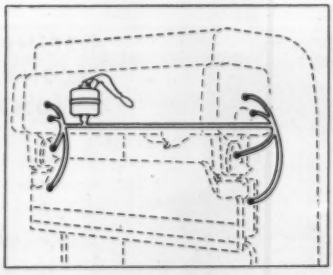
Completely enclosed transmission, running in oil.



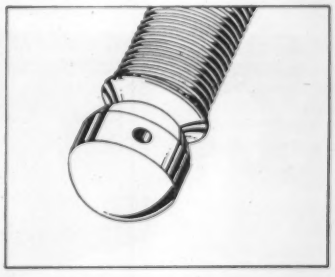
Two micrometer indicators, one at each end of the ram—easy to read and accurately record the amount of adjustment and tilt.



Centerline loading prevents weaving of the housings and insures accurate bends.



Centralized pressure lubrication system.



Ball end on the ram adjusting screws permits tapering of the ram for fade-out work.

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Brushless electro-magnetic brake and clutch.

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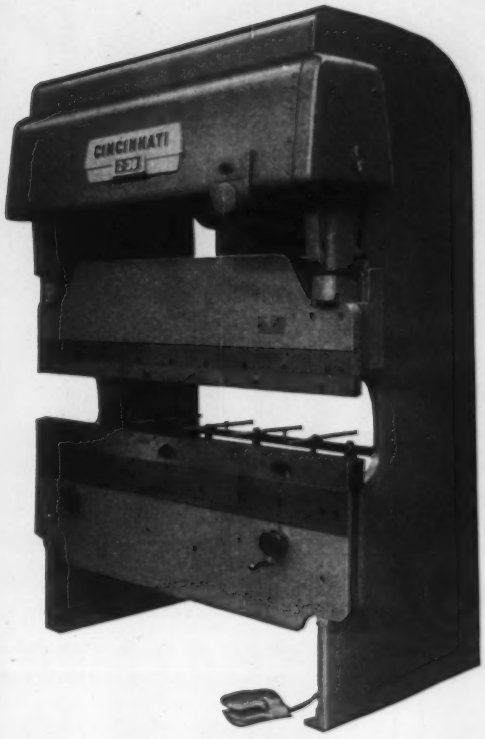


3-50 SERIES

These new 3-50 Series Cincinnati All Steel Press Brakes are built in two lengths and have a capacity of 10 gauge x 6′ mild steel. Investigate these unusual standard features: 3″ stroke—12″ shut height—12″ throat—distance between housings 6′-6″ or 10′-6″—overall die surface 8′-0″ or 12′-0″—front controlled, variable speed drive, 20 to 50 SPM.

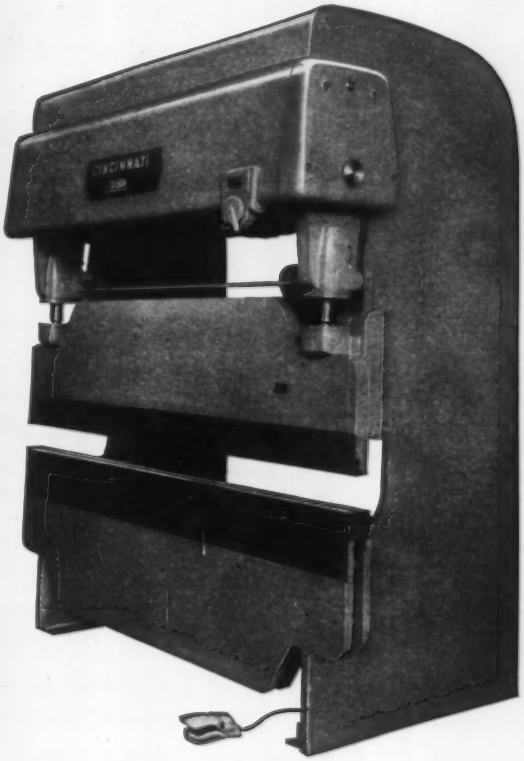
5″ motorized ram adjustment, including ram motor and control, complete with ram tapering adjustment for fade-out work.

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



ALLIS-CHALMERS FORK TRUCKS Give Over 6000 Trouble-Free Hours Of Operation At Neenah Foundry Co.

Neenah Foundry's chief mechanic, shown here at work on one of the Allis-Chalmers trucks with one of his men, has this to say about the superiority of this equipment: "They are tougher than the other trucks and require less maintenance. I like the overhead valves and wet cylinder sleeves. I think one reason the Allis-Chalmers trucks have out-performed the others is because they are easier to clean and service. I'm glad to see that they are replacing the old trucks with Allis-Chalmers trucks. This is going to make our job a lot easier."

For three years, Allis-Chalmers Fork Lift Trucks have been a part of a seventeen-truck fleet in operation at Neenah Foundry Company, a progressive, cost-conscious organization at Neenah, Wisconsin. During this time, the 4,000-pound capacity Allis-Chalmers trucks have been used continuously for handling heavy castings 10 to 12 hours per day. Yet because of their unusually sturdy construction, they have operated with only normal maintenance for well over **6,000 hours.** The rugged engines have required only normal tune-ups and oil changes, and are still in perfect running condition.

Moreover, the Allis-Chalmers trucks are doing a more efficient handling job, are operating on much less fuel, and are all but eliminating truck downtime and repair costs compared to the company's other equipment. **Brake lining and drum wear,** for example, always a serious problem because of fine foundry grit and sand, have been negligible—even after thousands of hours of operation.

Service and performance such as this—the rule, not the exception with Allis-Chalmers Lift Trucks—have made this equipment the choice of important foundries throughout the country.

Write today for your free copy of our 36-page, fact-filled booklet which explains in detail the many exclusive features making Allis-Chalmers Fork Lift Trucks industry's preference everywhere.

BH-1

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Empire State Building, world's tallest building.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

No "Plumbing" Needed ... NEW AIR-COOLED

HELIARC HW-17 TORCH

Trade-Mark

HANDLES UP TO 150 AMPERES

Shown here in actual size is the only air-cooled torch available for inert gas shielded arc welding with currents up to 150 amperes. With a continuous-duty capacity of 130 amperes (150 amperes for a reduced-duty cycle), this "mighty midget" handles many jobs that formerly required a water-cooled torch. Moreover, the HW-17 is unusually compact and lightweight for easy handling with minimum fatigue.

Elimination of external "plumbing", drain lines, mobile water pumps, and the like cuts original installation costs almost in half and drastically reduces everyday maintenance costs. With the air-cooled HW-17, for example, there are no time-consuming interruptions to clear clogged water passages or to repair leaking water hose connections.

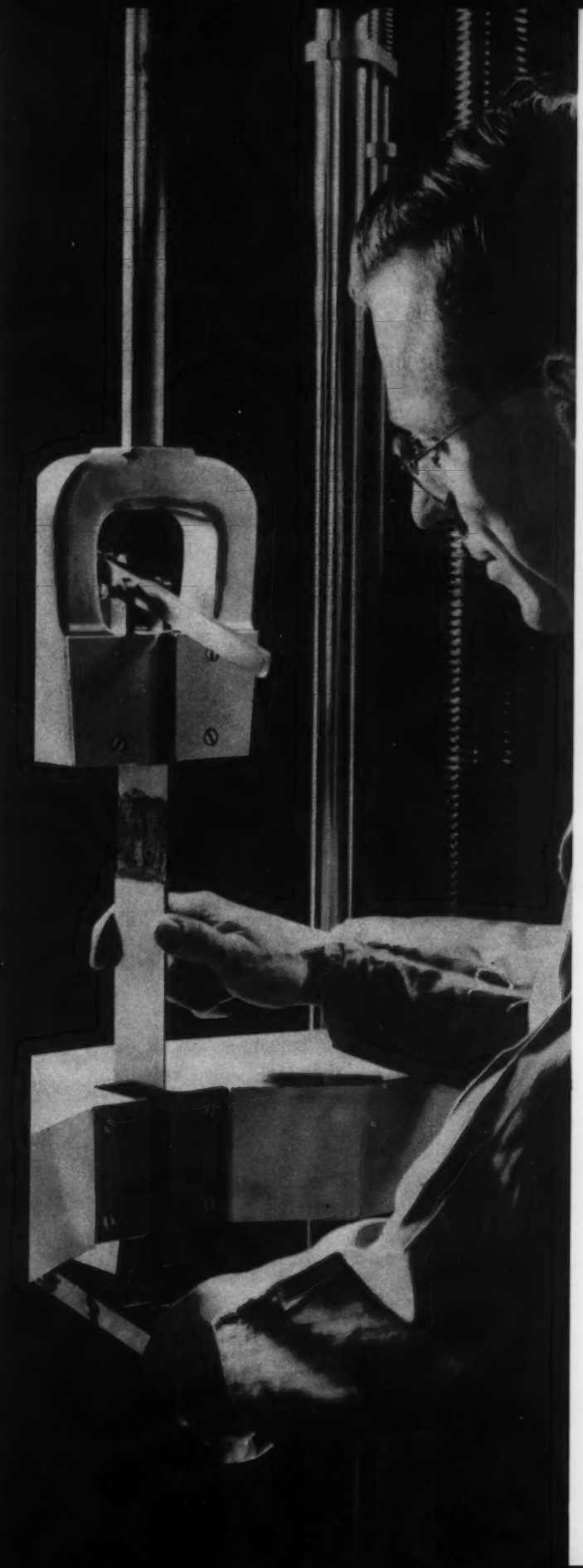
The HW-17 is a tough, shock- and heat-resistant torch fully capable of absorbing the hard knocks of all service within its range. Collets are actuated by a twist of the torch cap to provide easy adjustment of 7- or 3-inch electrodes.

See your local LINDE representative today, or write for further information.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
(formerly Dominion Oxygen Company)
Division of Union Carbide Canada Limited, Toronto

The terms "Linde" and "Heliarc" are registered trade-marks of Union Carbide and Carbon Corporation.

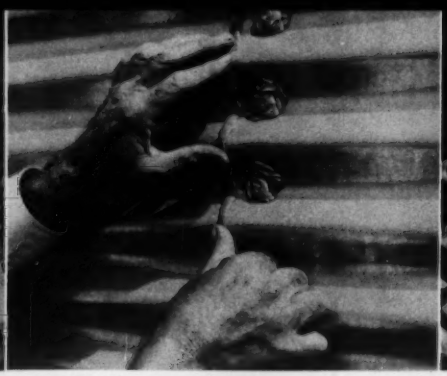
Linde
Trade-Mark



Only one material on earth

can improve the design of your product in each of the following 24 uniquely valuable ways! It's an adhesive material—like the modern, scientific adhesives, coatings and sealers developed by the research laboratories of 3M.

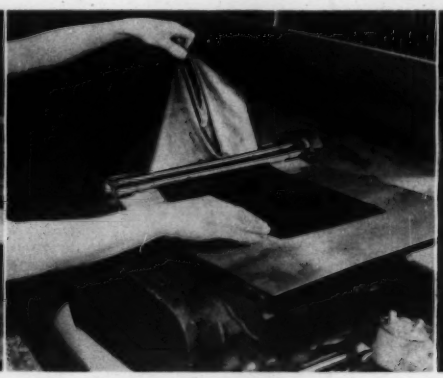
3M COMPANY

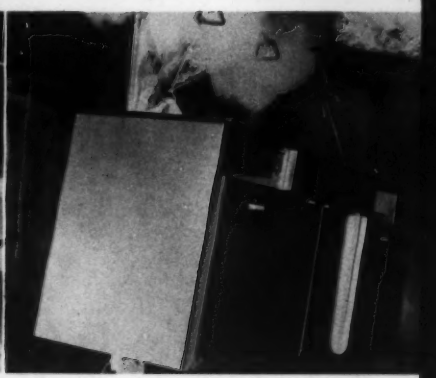


1 **Distribute Fastening Load** over the entire joint area. By giving continuous contact between mating surfaces, 3M adhesives minimize local stress concentrations. For instance, EC-404 is sprayed on this fibrous glass acoustical pad. Immediately it holds the pad in place under the automobile roof without sagging.

2 **Resist Fracturing** because of residual elasticity. Instead of separating, chipping or flaking, 3M adhesives absorb some of the stresses created by flexing, vibration and differing coefficients of expansion. Thus EC-612 provides a flexible, permanent, weather-proof non-shrinking seal for sheet metal structures.

3 **Reduce Weight** because 3M adhesives usually are lighter than the mechanical fasteners they replace. Also they allow use of lighter-gauge materials. Without adhesives like EC-1177 to bond components, the lightness and strength of today's honeycomb sandwich construction would be literally impossible.

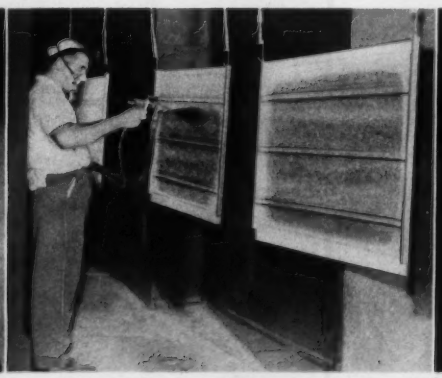




10 **Meet Varied Needs** of manufacturing processes. 3M adhesives have different tack and curing characteristics, can absorb oil, withstand paint operations or reactivate to suit your needs. Immediately after spraying, this 3M adhesive holds waffle felt so strongly that the truck cab top can be handled without delay.

11 **Apply Many Ways** to allow you greatest manufacturing efficiency. This plastic-coated cloth is roll-coated with EC-880 before being die-cut and bonded to phenolic resin. Other 3M adhesive application methods include: brushing, spraying, flowing, dip and knife coating, scraping, troweling and thumbing.

12 **Fasten While Resisting** heat, water and chemicals. EC-404 bonds sound damping pads inside the doors of these metal sink cabinets despite the following phosphatizing process: 1) strong detergent pressure spray, 2) wash, 3) phosphating spray, 4) two rinses, 5) drying oven temperatures reaching 500° F.



16 **Protect Against Erosion** by fast-flying particles. Rain or dust, for instance, can damage the aircraft that meets them at the speed of sound. So manufacturers apply a lightweight, long-lasting 3M coating. Because the coating has rubberized plastic base, it is not only tough, but flexible.

17 **Damp Vibration** and sound in a single, quick, economical operation. Here, 3M Coating EC-1000 is sprayed on movable metal wall panels. Immediately the backs of the panels are primed and baked without damage to the coating. Installed, the panels make rooms that are quieter, less affected by vibration.

18 **Protect During Assembly** and manufacturing. Sheet metal is coated with oil-resistant EC-968 before being formed into this water cooler top plate. During seven die operations, the coating stretches with the metal, shields it from die marks. Then it is easily stripped off in a continuous film by hand.

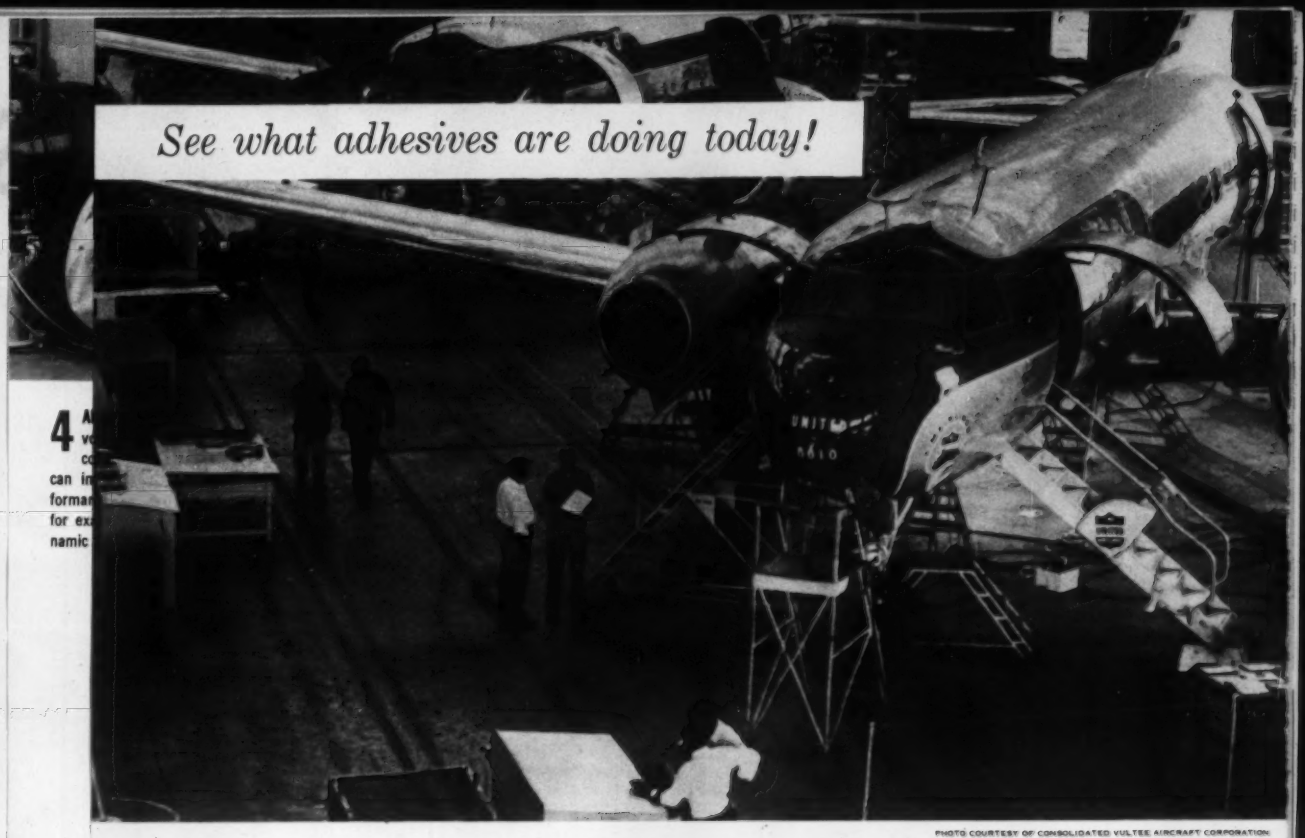


PHOTO COURTESY OF CONSOLIDATED VULTEE AIRCRAFT CORPORATION

Materials that perform better on the assembly line and in the finished product, too, make possible design advances in mass production industries. Aircraft makers are building better planes for less with 3M adhesives.

From aircraft to air conditioning— 3M adhesives are the sign of advanced design

Do you know the amazing things scientific 3M adhesives are doing for today's product design? They are bringing design improvements to almost every metalworking industry. Designs utilizing 3M adhesive products are paying off sales-wise and cost-wise with: simpler shapes, smoother surfaces, greater strength and durability, less need for close tolerances, fewer parts and production operations. In many cases, these design improvements would be impossible without modern adhesives.

Air conditioning is one of many custom fabrication and installation fields in which 3M adhesives offer fast, easy application, plus dependability.

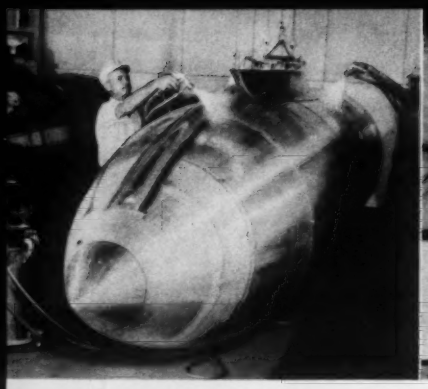


PHOTO COURTESY OF MUSKEGON PISTON RING CO

4 **Allow Smoother Contours** by filling gaps and voids, replacing mechanical fastenings, or covering bolts and rivets. Thus adhesives can improve product safety, beauty and performance. By smoothing out surface variations, for example, 3M coatings improve the aerodynamic qualities of aircraft.

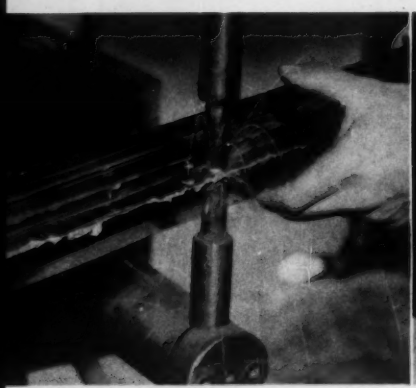
5 **Allow Complex Shapes** to be fabricated, which might be impossible with conventional fasteners. Oil rings, "unitized" with a 3M adhesive, don't separate during handling, despite extreme expansion or distortion. Yet, in a running motor, the adhesive dissolves to let the rings perform unhindered.

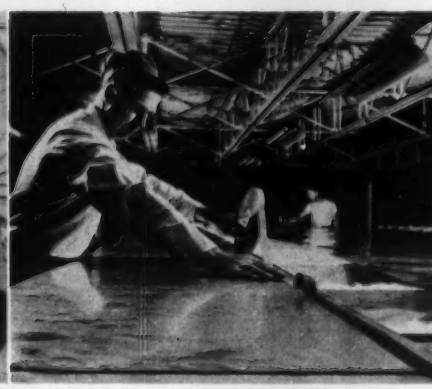
6 **Speed Assembly** by reducing the number of operations. With EC-847, this one man daily installs fiberboard covers in more than 1000 air conditioner compressor housings. The previous method involved a weld, a nut, a screw and a steel cover. Now, the 3M adhesive cuts assembly costs, allows fewer parts.

IN ALL THESE 24 WAYS

3M adhesives, coatings and sealers cut metalworking costs, add to product quality!

3M adhesives, coatings and sealers are as versatile as metal itself. Only a few of their known uses are shown on these pages. And every day they're improving product performance and cutting costs in new, unexpected ways. Each 3M adhesive is tailored to fit specific job requirements. Yet often the same adhesive can perform many different jobs. In fact no other type of material can do all the varied things that 3M adhesives do so well, so inconspicuously, so economically. Examine the 24 abilities of 3M adhesives, coatings and sealers illustrated on these pages. Consider what 3M adhesives can do for you.

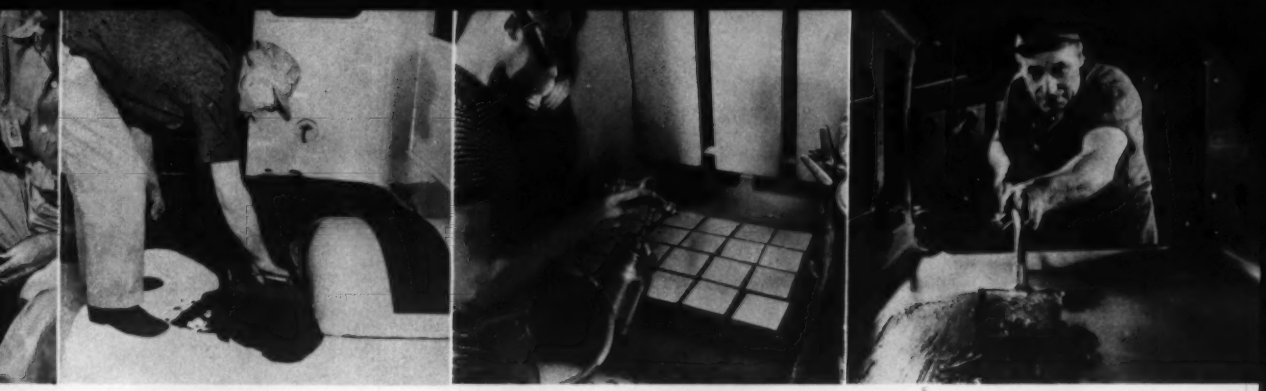




19 **Seal Welded Seams** tighter against weather and water by allowing the welds to be made right through the sealer. During spot-welding, EC-1168 neither splatters nor burns. And as it squeezes away from the immediate weld area, it fills in tightly all around to form a permanent seal.

20 **Seal Air,** gas and fumes in or out at seams and joints. EC-750, for example, seals the joints of air conditioning ducts. Thus, this 3M sealer prevents air escape, insures top efficiency. Neither heat nor cold affects this sure, permanent seal. Other 3M products seal pressurized aircraft cabins.

21 **Seal With Ribbon** sealers that give flexible, weather-tight seals between mechanically held surfaces. In the trailer industry, and many others, EC-1202 applies with exceptional ease to seal sheet metal lap seams and joints. Workers press EC-1202 on one surface, fasten down the mating surface.



7 **Protect By Fastening** with a continuous adhesive film which resists corrosion. This film keeps corrosive moisture, gases, dust and fluids from entering between mated surfaces and into interior voids. Thus 3M Adhesive EC-1233 both anchors this rubber floor mat and also increases durability of the bus floor.

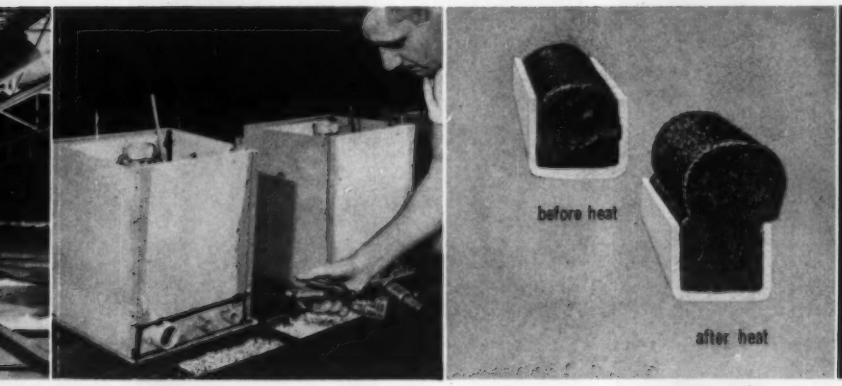
8 **Apply More Rapidly** than most fastening devices. No drilling, aligning or rivet bucking is needed. A quickly sprayed layer of EC-776 will bond these aluminum plates to anodized aluminum cores for camera film holders. The 3M adhesive was selected as more economical, easier and less conspicuous than spot-welding.

9 **Apply More Easily** with unskilled labor. Workers can apply most 3M adhesive products with little or no training, yet gain dependable results. This man brushes EC-321 on the chemically etched metal interior of an incinerator cabinet. The nonflammable adhesive will hold fibrous glass insulation.

13 **Join Varied Materials** of the most diverse sorts to themselves and to one another: metal, rubber, wood, plastic, linoleum, felt, wallboard, ceramics, paper, glass insulation. A manufacturer makes these bus seats without tacks by bonding fabrics, sponge rubber, metal, leather, vinyl and carpeting with EC-164.

14 **Protect Against Abrasion** with tough, resilient coatings. This worker sprays abrasion- and corrosion-resistant EC-1141 on coil springs for railroad cars. Though grease collects on the springs later and may ignite, the coating will not burn off. Other 3M coatings form walkways and anti-glare surfaces.

15 **Protect Against Corrosion** and rust by shielding metal surfaces with moisture-proof, waterproof coatings. Various 3M coatings also resist detergents, oils and fumes. The life expectancy of this railroad car is being increased by priming the sub-floor with EC-524, then coating it with EC-831.



Sketch of cooling tube with 3M sealer showing normal heat transfer area and extended area created by conductive compound.

22 **Seal Seams** and joints to shut out moisture, water, dust and detergents, and thus prevent corrosion. EC-895, a rubber-based 3M sealer, bars moisture from all openings in the "low-side assembly" box of this water cooler. It also completely seals the housing, keeps moisture out of granulated cork insulation.

23 **Swell To Seal** even irregular voids and gaps. EC-1055 is applied quickly by hand in extruded bead form, left. During heat curing, it expands by as much as 100 per cent or more, right. Entirely solid, EC-1055 forms a positive, uniform gasket-like seal that holds out water, dust and dirt.

24 **Conduct Heat** to increase the efficiency of refrigerating units. Manufacturers flow a heat conductive 3M sealer between the coils and shells of home freezers. The diagram above shows how the sealer increases contact area, thus accelerates the rate of heat transfer. The consumer gains lower operating costs.

In product, in production

3M RESEARCH CAN MEAN
PROGRESS THROUGH
ADHESIVES FOR YOU

If you fabricate a metal product, chances are a 3M adhesive, coating or sealer can both improve it and cut your costs. You owe it to your product to find out. Use the coupon below. Write 3M for full facts now. 3M research is your assurance both of uniform high quality and of painstaking formulation to fit your job. Whether you face a specific problem or a general need, consult: Minnesota Mining and Manufacturing Company, Adhesives and Coatings Division, Dept. F-1, 417 Piquette Ave., Detroit 2, Mich. Quality adhesives may be the answer.

FIND OUT WHAT ADHESIVES CAN DO FOR YOU—WRITE FOR FULL INFORMATION

Minnesota Mining and Manufacturing Company
Adhesives and Coatings Division,
Department F-1, 417 Piquette Avenue,
Detroit 2, Michigan

Sirs:

Please send me detailed information on the newest uses of 3M adhesives, coatings and sealers in the following industry(ies):

- ☐ Automotive
- ☐ Railroad
- ☐ Buses and Trucks
- ☐ Aircraft
- ☐ Insulation
- ☐ Trailers
- ☐ Refrigeration and Air Conditioning
- ☐ Sheet Metal
- ☐ Other (.....)

In addition, I would like further information on the applications of 3M products illustrated by the pictures in this advertisement bearing the following numbers:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

MY NAME _____

TITLE _____

COMPANY _____

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ADHESIVES AND COATINGS DIVISION • **MINNESOTA MINING AND MANUFACTURING COMPANY**

417 PIQUETTE AVE., DETROIT 2, MICH. • GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 99 PARK AVE., N. Y. 16, N. Y. • CANADA: P. O. BOX 757, LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

West Charlotte Senior High School, Charlotte, N. C.
Graves & Toy, Architects.
Mechanical Engineers Inc., Heating Engineers.

Youngstown's Yoloy Pipe is shown in the process of being installed. In a radiant heating system like this, the pipe must be good as it's put there to stay.

YOUNGSTOWN YOLOY PIPE chosen for radiant heating system at West Charlotte High School

This handsome school won a First Award in the 1955 School Executive magazine competition. It also won an A.I.A. Award of Merit. Justifiably, too, as it is the result of years of planning by a group of Charlotte's educators and architects.

How fitting that far-sighted civic leaders like this chose Youngstown's Yoloy Pipe for the radiant heating system. For, Youngstown Yoloy is a low alloy steel that is especially resistant to corrosion and shock. Made only of the finest steel, with additions of nickel and copper to give it those desirable extra qualities. Youngstown's Yoloy Pipe is controlled by its sole producer from ore mine to the final operation. Yoloy Continuous Weld Pipe is used most economically in many industrial and snow removal systems as well as in train pipe installations.

Having problems?

For further information write for our free booklet "The ABC of Yoloy Continuous Weld Pipe and its corrosion resistance".

Youngstown

QUALITY YOUNGSTOWN SERVICE

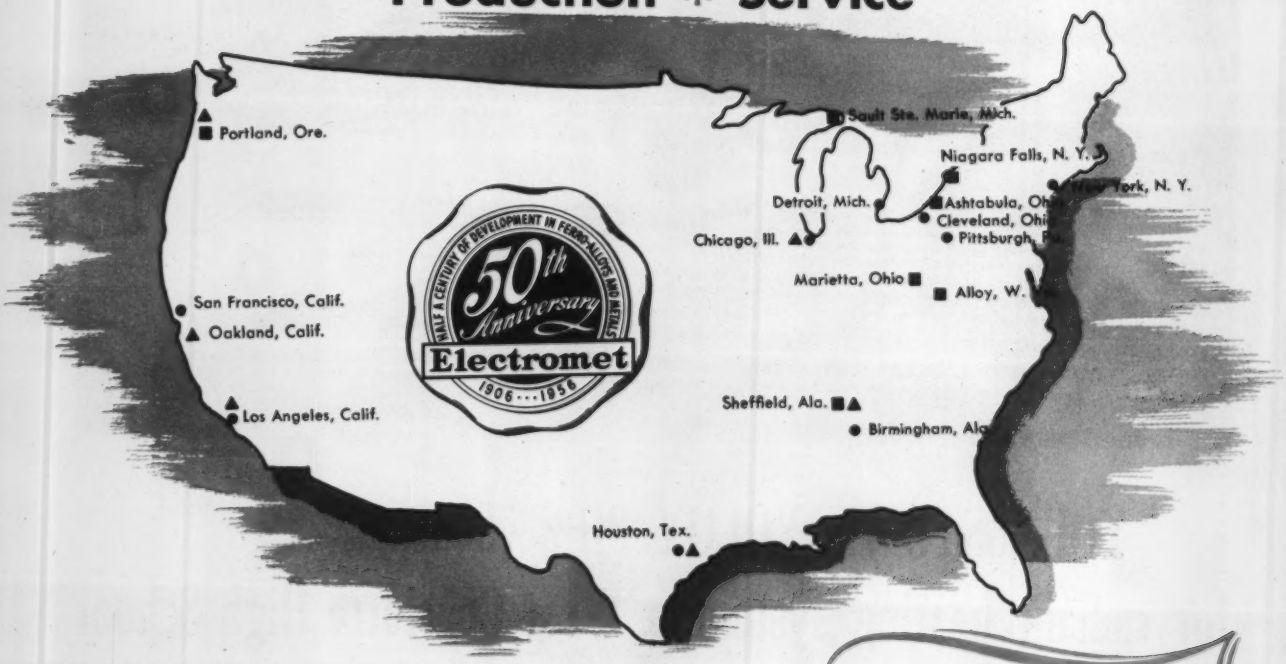
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

You Benefit from ELECTROMET'S

through Research * Development

Production * Service



For 50 years ELECTROMET has produced ferro-alloys and metals essential in the production of steel, iron, and non-ferrous metals. Research and development by ELECTROMET during these 50 years have provided the trade with new and better alloys and metals to meet specific needs. Increased emphasis on research and development promises continued benefits in the future.

The ELECTROMET story is one of steady growth and progress for the benefit of the metal industries. When you buy from ELECTROMET, you get the best in alloys and service plus the advantages of long manufacturing experience and extensive research.

Here are some of the advantages you get from ELECTROMET'S *integrated programs.*

Competent Metallurgists and Sales Engineers

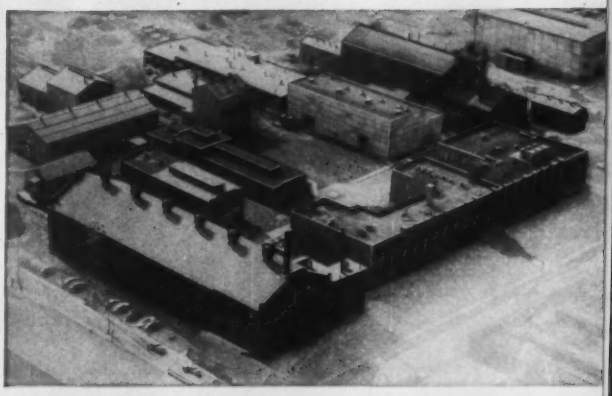
Nine sales and service offices are strategically located in the major steel producing centers as shown on the map above. If you have a problem on metals or alloys, let one of our experienced metallurgists or sales engineers help you. He will be glad to assist you with any problems on the production of quality steels, irons, and non-ferrous metals. Simply telephone or write the ELECTROMET office nearest you.

B Ca Cb Cr Mn Si Ti V W Zr

50 Years of Experience

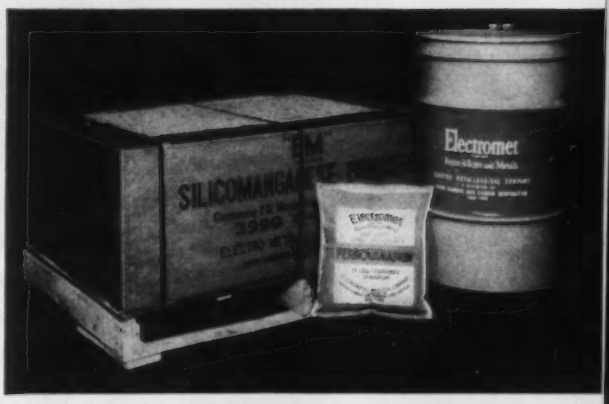
Continuing Research and Development

Since 1906 ELECTROMET has carried on a three-way program of research, development, and technical service. More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories and Development Laboratories at Niagara Falls (shown here). This program provides you with new ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons. Innovations are fully developed in our laboratories before they are offered commercially.



Wide Range of Alloys to Meet Your Needs

Over 50 different products are manufactured to meet the regular requirements of the metal industry as well as the special needs of customers. This wide range of high-quality ferro-alloys and metals is the result of 50 years of research, development, and service by ELECTROMET. ELECTROMET offers the widest selection of ferro-alloys and metals to meet your specific requirements.

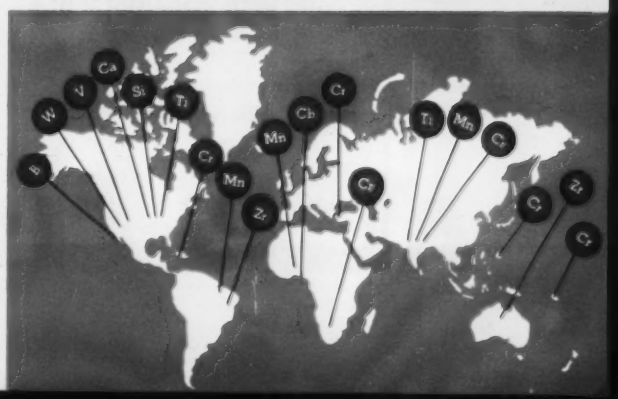


Seven Modern Plants—4 With Own Power Facilities

Our plants have been greatly expanded and modernized to meet the current demands for ferro-alloys and metals. The recently completed plant at Marietta, Ohio, is the world's largest ferro-alloy plant. Company-owned power facilities at four of the plants assure a constant supply of power for efficient production. Prompt shipment of ELECTROMET ferro-alloys is assured from all seven plants, and from six warehouses conveniently located to serve you.

World Wide Ore Sources

The availability of ores, and other raw materials is assured by ELECTROMET's diverse facilities, including mines and ore milling plants owned by UNION CARBIDE. Helping to assure adequate ore supplies are the ore buying facilities of Union Carbide Ore Company, a Division of Union Carbide and Carbon Corporation. Ores come from the far corners of the earth to ELECTROMET's plants. On this simplified map of the world, symbols for the chemical elements indicate a few of the major sources of alloy ores.



ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

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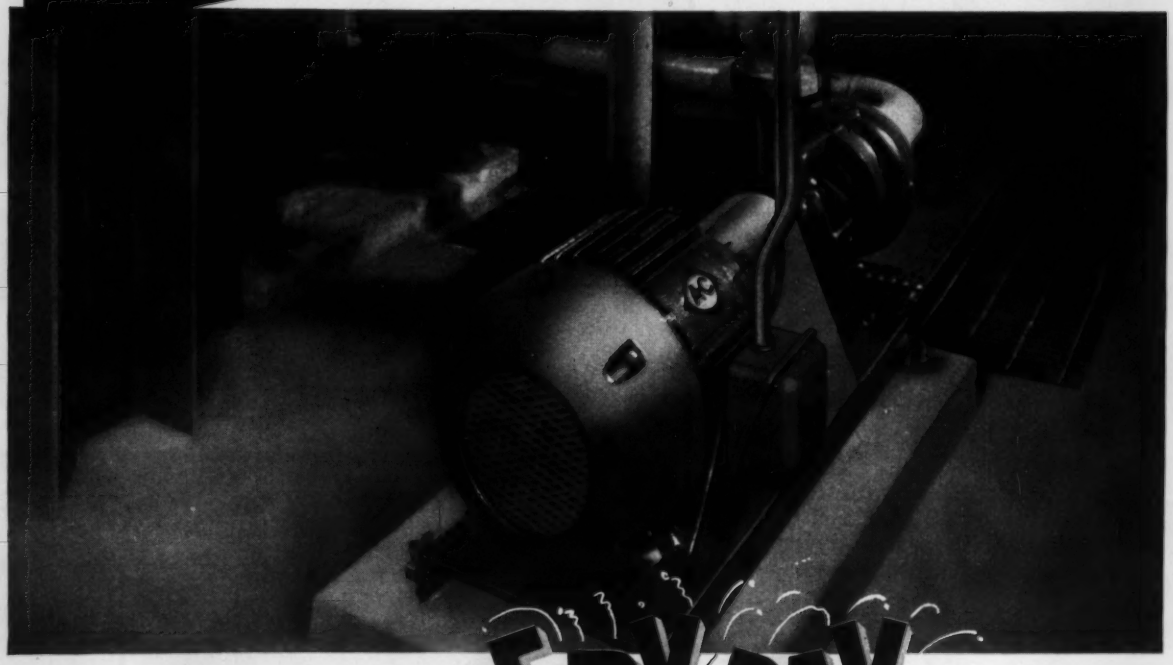
The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

There's **MORE** Cooling Surface in these deep-ribbed **MOTORS**



No Day is FRYDAY

with these Allis-Chalmers MOTORS

● Frying of insulation is impossible under normal conditions with the extra-large cooling surface of Allis-Chalmers rib-type TEFC motors. The result—you expect and get longer motor life.

The engineered partner of A-C motors is Allis-Chalmers control.

Get Complete Information

As a new machinery component or as replacement, specify Allis-Chalmers. Discuss your particular application with your nearby A-C distributor, A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4880

any shape...any size...
any kind of ductwork
is better with
galvanized steel...
is best with

WEIRKOTE

In manufacturing ductwork, galvanized steel has long been relied on for ease and economy of fabrication . . . also providing maintenance-free long life.

But now, ever more fabricators are turning to Weirkote to do the job. Why? . . . Because Weirkote is the superior galvanized steel sheet, produced by the most modern continuous galvanizing process . . . quality-controlled from start to finish. It has the tightest of tight zinc coatings . . . resists cracking, peeling, flaking and, above all, corrosion as does no other metal for ductwork of proved durability. Weirkote is far stronger, more rigid, more heat-resistant. These are only a few of the reasons why we say: *In the long run, galvanized steel . . . is the STRONGER run,* WEIRKOTE. Let Weirton show you why!

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

WEIRTON STEEL COMPANY

NOW... the expanded line of KENDEX* Tooling

meets broad range of job requirements

The ever increasing demand for Kendex tooling is indicative of the wide application of the Kendex principle to all types of machines: turret lathes, engine lathes, planers, milling machines, and automatic cycling machines. To meet this growing demand, Kennametal† has more than doubled the number of sizes of Kendex toolholders, and now offers a complete line of inserts for all holders and job requirements. This expanded line now includes:

- **17 Kendex holder styles and 101 different tool sizes in a rugged, simple, trouble-free design . . . proven on a broad range of applications**
- **a wide selection of standard nose radii (non-standard radii also available at slight added cost)**
- **a complete line of Kennametal inserts for all job requirements . . . to fit all tool holders now in use**

Thus, Kennametal now offers the exact style of Kendex tooling you need . . . positive or negative rake holders: square, triangular, round or heavy duty inserts with correct nose radii for use with your present holders. Regular inserts (ground top and bottom only) and precision inserts (all surfaces ground) are stocked in a broad range of grades.

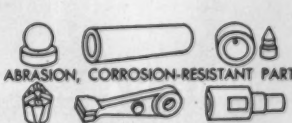
Why not discuss your tooling problems with a Kennametal tool engineer and let him show you how Kennametal tooling can provide the right answer on any machining job. Or write to KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered Trademark; Patent applied for †Registered Trademark

A-9423

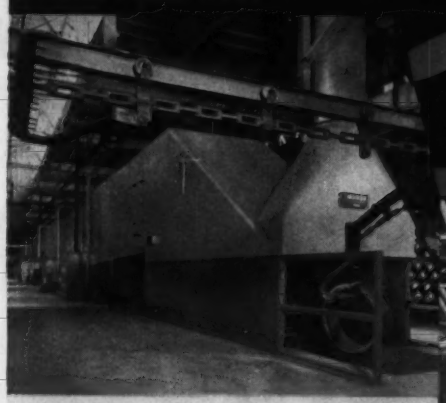
Give your machines the tools they deserve . . . the BEST

INDUSTRY AND
KENNAMETAL
...Partners in Progress



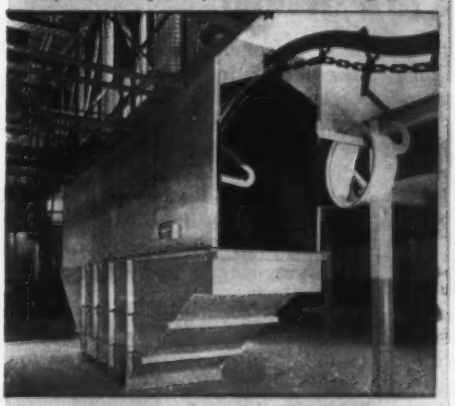
COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

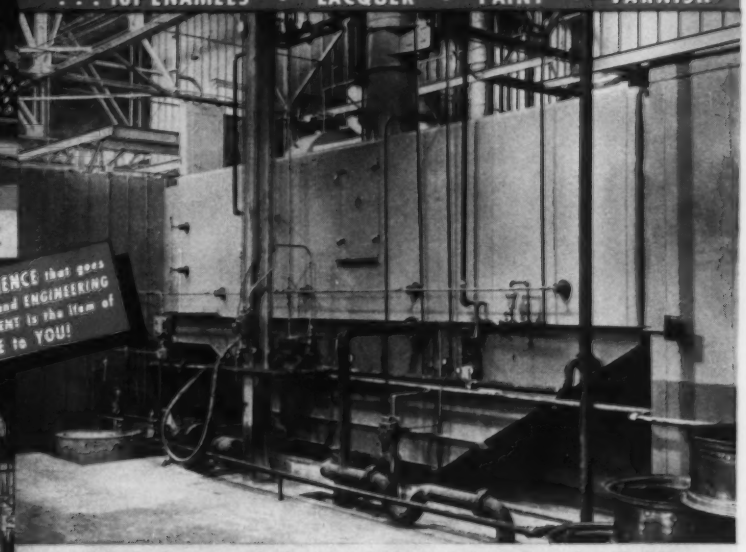


Mahon Six-Stage Metal Cleaning and Rust Proofing Machine—part of a Complete Mahon System for Painting Truck Wheel Rims.

Mahon Overhead Finish Baking Oven with Drip Enclosure and end of Dip Coater in foreground—part of the same Rim Painting System.



Mahon Dip Cooling Unit designed to expedite cooling of Rims emerging from Finish Baking Oven to handling temperature.



Mahon Dip Coater—part of a Complete Mahon Finishing System for Painting Truck Wheel Rims. Paint Mixer and other facilities are provided to maintain Epon Paint at constant temperature.

Complete Mahon DIP COATING System Finishes Truck Wheel RIMS at MINIMUM COST!

Illustrated here are major units of processing equipment which, with other facilities, make up a Complete Mahon Finishing System designed especially for coating truck wheel rims with Epon Paint. The system includes a Six-Stage Metal Cleaning and Rust Proofing Machine, Cooling Tunnel, Dip Coater, Ventilated Drip Enclosures, Filtered Air Supply System, an Overhead Finish Baking Oven and a Dip Cooler. This is another typical Mahon solution for a manufacturer with a particular finishing job . . . it produces a fine finish in minimum time with a minimum of attention, and at an absolute minimum cost per unit painted. If you have a finishing problem, or are contemplating new finishing equipment, you, too, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified also, to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether you require a Complete Finishing System for Spray Painting—either Manual or Electrostatic, Flow Coating or Dip Coating, you will find, if you investigate, that Mahon equipment will serve you better . . . because, Mahon equipment is engineered better and built better for more economical operation over a longer period of time. You can rely on Mahon to do the complete job on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which may upset your production plans and subsequent schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

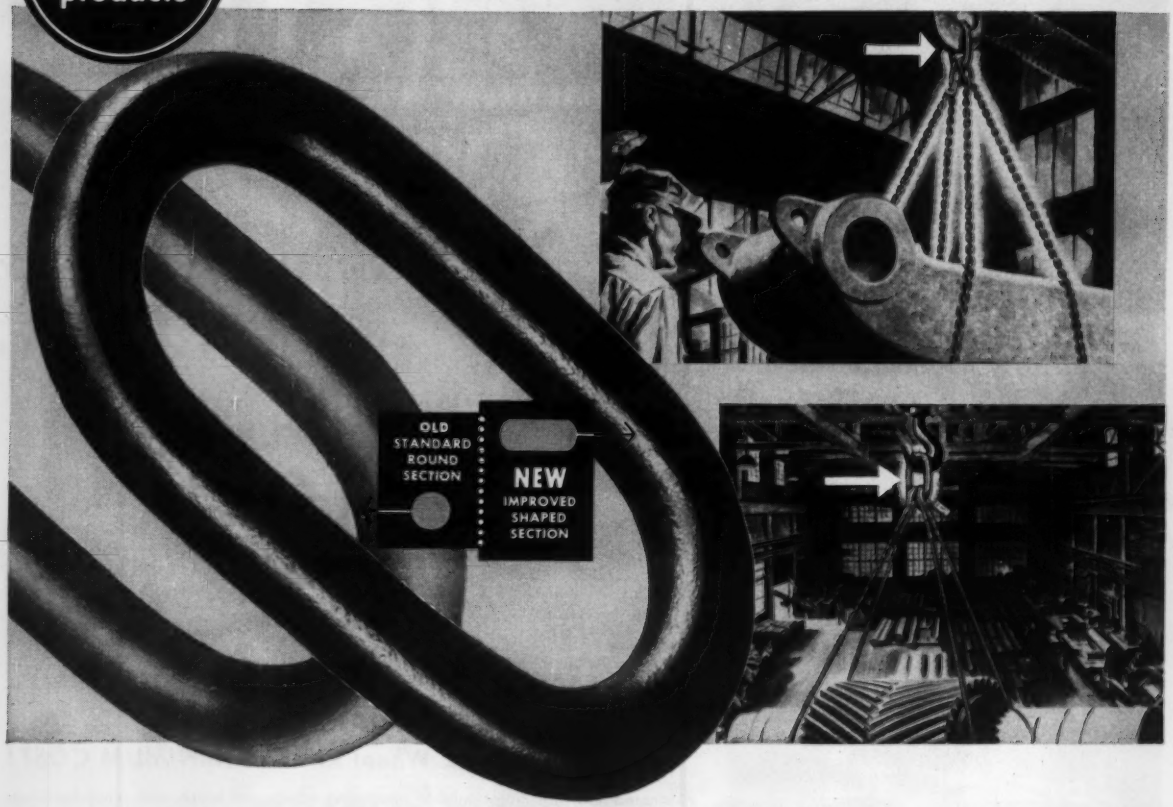
Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

ACCO products

ACCO Registered* Slings–Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



New Master Link for Slings—Either Chain or Wire Rope—Holds Its Form Under Loads Up to 18% Greater

• Latest product of the continuing research behind ACCO *Registered* Slings is this new Shaped Section Master Link. ACCO's engineers found that by shaping the link—as shown above—they could give it more "dimensional stability"—a better "section modulus." Translated into layman's English this means that the new shaped link, without any increase in weight, will withstand deformation under loads up to 18% greater than a standard round section link will.

Just as shaping a quantity of metal into a structural I-Beam allows it to handle greater loads than it could as a solid beam, so does ACCO's Shaped Section Master Link give better performance under greater loads than a link with a round section.

The new shaped link is smoother and provides a greater factor of safety. It is a better and safer link. It costs us more to make. But it will be offered on all ACCO *Registered* Slings—both wire rope and chain—at no increase in price.

AN EXTRA BONUS OF SAFETY

This latest technological advance adds an extra bonus of safety to ACCO *Registered* Slings.

Each component of an ACCO *Registered* Sling is made from the best materials procurable for its use. Each part must prove to have strength equal to or greater than the sling body. All hooks for ACCO *Registered* Slings are Magnaflux tested. Then these components are assembled into slings according to carefully engineered designs that have proved themselves in rigorous field tests.

The completed sling is then individually proof-tested to twice the working load limit. Then and only then, is it awarded the coveted ACCO Registration Certificate and the identifying ring or tag.

SEE YOUR DISTRIBUTOR

ACCO *Registered* Slings are readily available from a distributor near you. If you don't know him write to our Bridgeport office for his name.

*Trade Mark Registered

ACCO

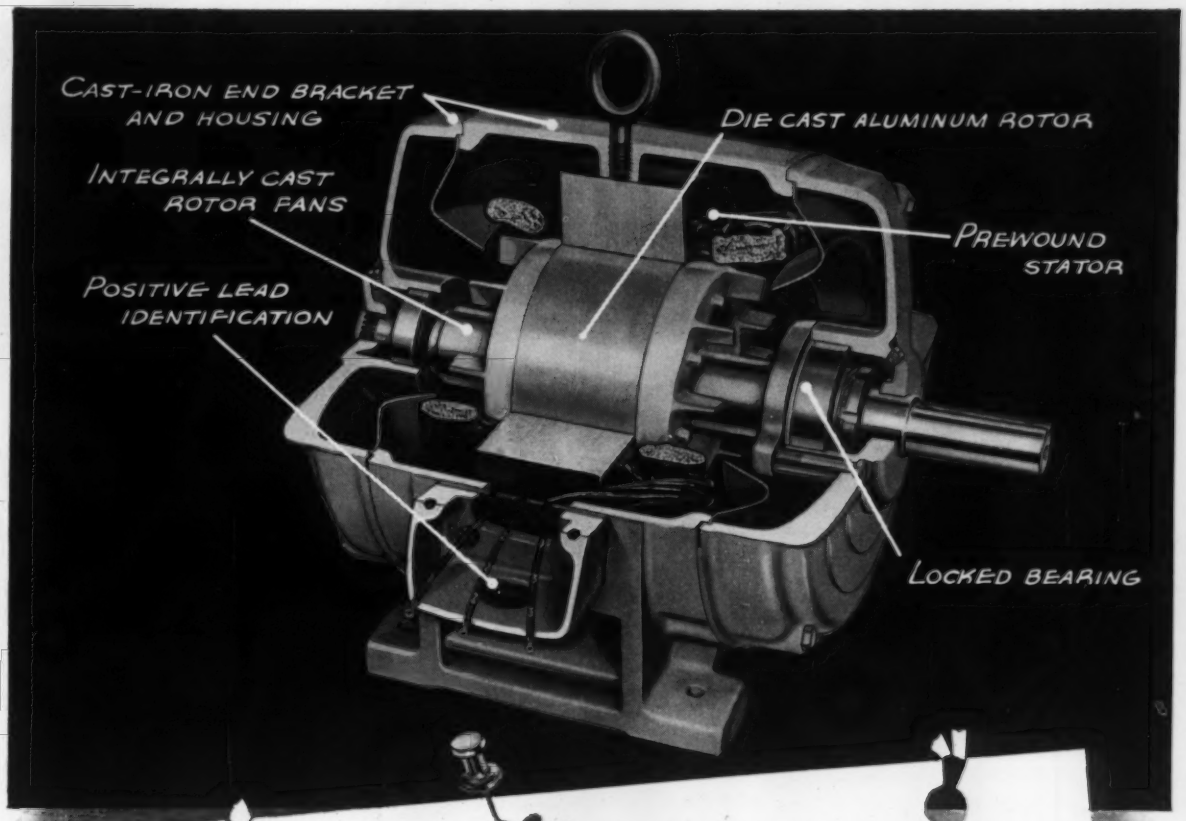
TRADE MARK

AMERICAN CHAIN & CABLE

BRIDGEPORT, CONN.

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

Better Value



Are you getting all these extras in the motors you buy?

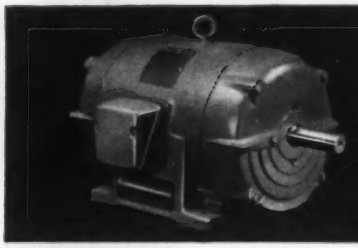
Louis Allis gives them to you, because they build their standard motors with special care

For years, Louis Allis has specialized in special motors for many of industry's toughest drive problems. Such installations call for extreme care in both motor design and manufacture—care that has become a habit with us. That's why we build our standard motors with special care.

What does this mean to you? It means that you get a motor with extra features —a motor that runs better, lasts longer. Here are a few of the extra reasons why:

- New exclusive phenolic impregnating varnish provides high thermal and chemical resistance. It remains resilient and resists aging for longer motor life.
- Locked bearings, inner race to shaft, outer race to end bracket, reduce end play and increase bearing life.
- Increased protection not only for the motor, but also for operating personnel. Double end ventilation permits maximum end bracket enclosure—prevents foreign matter from entering motor.
- Quiet operation obtained by careful design and test. Close manufacturing tolerances assure perfect alignment and minimum electrical noise.

There are many other features such as cast iron construction, positive lead identification, split conduit box—but our new bulletin No. 1700 describes all the many extras you get in a Louis Allis standard motor. Write for your copy.



A complete line of standard rerated motors in frames 182 through 326U now in stock. Special rerated motors are available on short delivery.

LA-108

THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Low permanent growth from iron-oxide attack minimizes end wall buckling and spalling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. High MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

CHEMICALS
KAISER
REFRACTORIES

Expansion tests show why you get SUPERIOR END WALL SERVICE with Kaiser Periclase-Chrome Brick

ONE REASON why Kaiser Periclase-Chrome Brick assures better end wall service for many leading steel producers is shown by this laboratory test of the effect of steel plates on permanent growth.

In this test, pre-fired 9x4½x3" bricks of two types were compared: brick having a chrome-magnesite ratio of approximately 75 to 25, and Kaiser Periclase-Chrome Brick.

Both types of brick were laid up as headers, forming the side walls of a tangentially fired pot furnace. 16-gauge steel plates were applied to the four sides of the bricks. The bricks were set loosely, with only 4 courses of brick overlaying the test pieces.

The effects produced in the laboratory were the result *solely of the heating and iron oxide reaction*. Heating and atmosphere conditions were identical on each type of brick. The furnace was heated with gas to 3100°F. ± 25°, and held at this temperature for 16 hours. Heating and cooling was at the rate of 75°F. per hour to minimize thermal spalling effects.

Results of the test

After cooling, the bricks were separated and photographed. (See picture.) Note strings stretched from top corners of new brick on ends of each row. Comparative growth on hot faces of brick shows above strings. The upper row of brick is the chrome-magnesite type. The maximum linear cold expansion of these bricks was 1" or 11%, with an average of 9%.

The lower row of bricks are Kaiser Periclase-Chrome. The maximum linear cold expansion of the Kaiser brick was only $\frac{3}{16}$" or 2.1%, with an average of only 1.4%.

These values are in addition to the reversible thermal expansion, in each case.

Also, note in the picture the cracking of the chrome-magnesite type brick caused by the relatively great iron-oxide swelling. The Kaiser Periclase-Chrome Brick is free from such cracks.

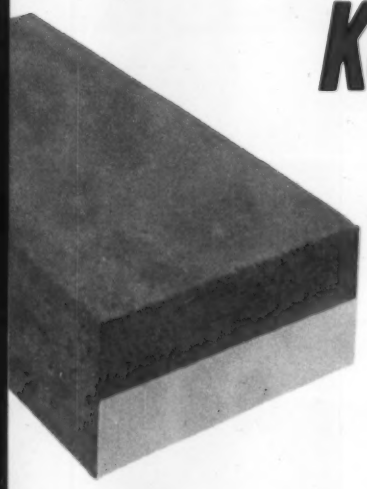
The superiority of Kaiser Periclase-Chrome Brick

This test indicates only one of many reasons why Kaiser Periclase-Chrome Brick gives hearth operators better end wall service.

The special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag. This superior brick can greatly increase end wall life or greatly reduce wall thickness to cut costs, when end wall service is balanced.

Call or write any of the sales offices listed below for immediate attention to your end wall particular problems.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).



Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

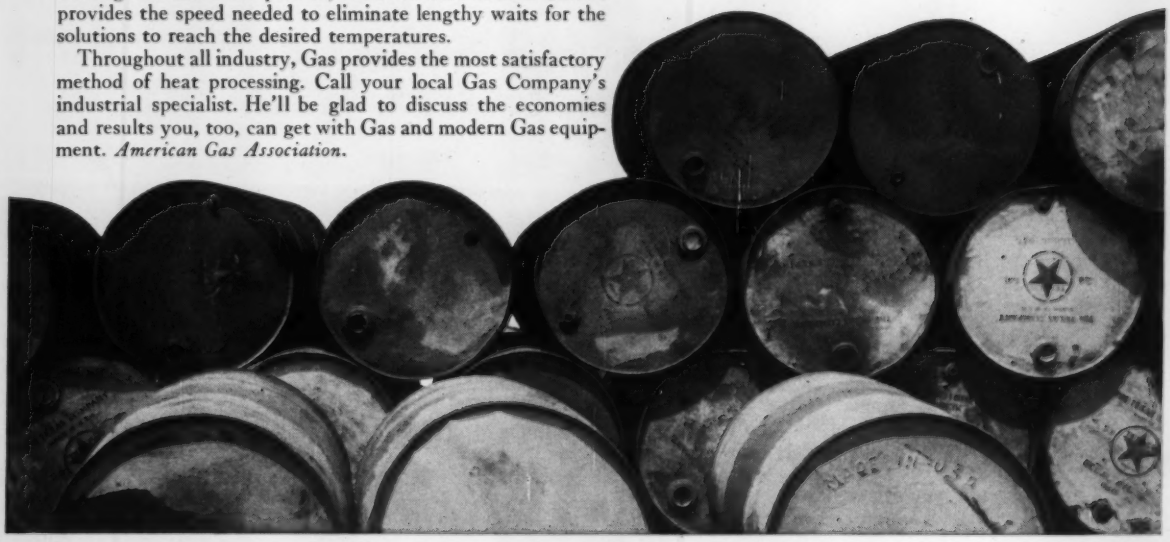
- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

New life for old drums . . . thanks to GAS

Here at the Prime Drum Corporation in Norfolk, Virginia, old steel drums are refurbished in a series of Gas heat processes. The drums are stripped of rust and foreign matter in a caustic soda solution heated by Gas. They are then neutralized in water, and dried prior to painting.

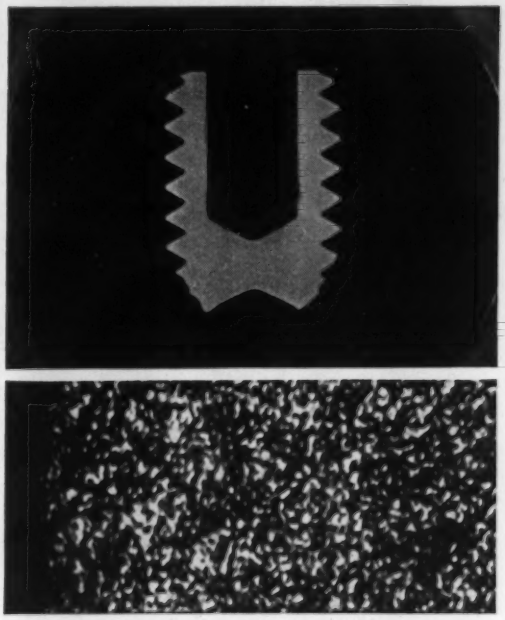
Gas heats the water, drys the drums, bakes the paint. Throughout the entire process, Prime Drum relies on Gas. It provides the speed needed to eliminate lengthy waits for the solutions to reach the desired temperatures.

Throughout all industry, Gas provides the most satisfactory method of heat processing. Call your local Gas Company's industrial specialist. He'll be glad to discuss the economies and results you, too, can get with Gas and modern Gas equipment. *American Gas Association.*

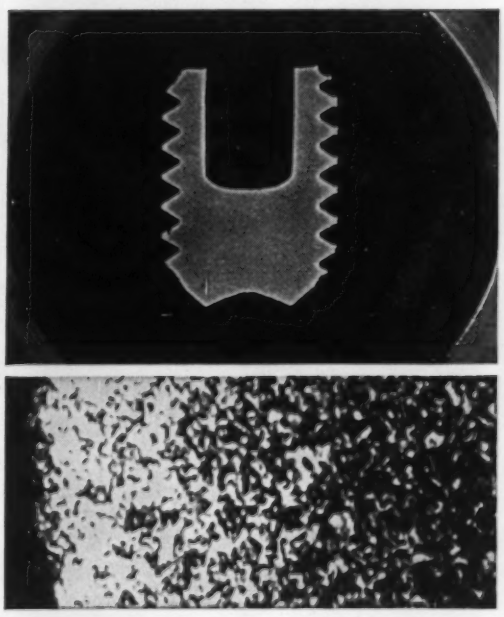


New heat-treatment methods help High-Torque Unbrako socket set screws withstand up to 40% Higher Torques

UNBRAKO SET SCREW



ORDINARY SET SCREW



—you can set them and forget them

Research had proved that the tighter you seat a set screw the better it works. So we developed a set screw that could be tightened tighter than ever before without damaging the screw. One of the problems was developing new methods of heat treatment to eliminate decarburization. Decarb of course plays havoc with a screw. Put a wrench in the socket and you ream it. Run the screw into a tapped hole and you strip its threads. Try to seat it and its point shears off. These photographs are a study in contrasts. The UNBRAKO is clean, its grain uniform. There is no decarburization —the ordinary set screw is suffering from an overdose of it, socket walls, threads and point are full of the telltale white spots.

You can't buy a better screw than an UNBRAKO. And you can't get full *high-torque* performance without a "High-Titan" UNBRAKO Hex Key—the high-ductility, precision internal wrenching tool. See your industrial distributor. Or write STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

STANDARD PRESSED STEEL CO.

UNBRAKO® SOCKET SCREW DIVISION SPS JENKINTOWN PENNSYLVANIA

For iron-ore sintering...

Koppers designed and constructed

SINTERING becomes a more vital consideration each day to production men who must meet the heavy demand for steel. Sinter makes it possible to obtain maximum production from existing blast furnaces. By economizing on coke rate, it also squeezes the most out of the available coke supply.

Koppers designed and constructed the machine shown here for the Weirton Steel Company, Weirton, West Virginia —a division of National Steel Corporation. It is the *first* 8-foot-wide sintering machine in the United States. It has the capacity to make more iron-ore sinter than any other machine in the country.

Weirton Steel's new machine is sintering fines from Labrador ore as well as from Great Lakes ore. It is producing good quality sinter for the company's blast furnaces.

Designing and constructing sintering plants is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, **you can count on Koppers.** You are invited to consult with our Engineers and Management.

NATIONAL ENGINEERS' WEEK
ENGINEERING BUILDER OF A BRIGHTER FUTURE

KOPPERS®

Engineering and Construction Division

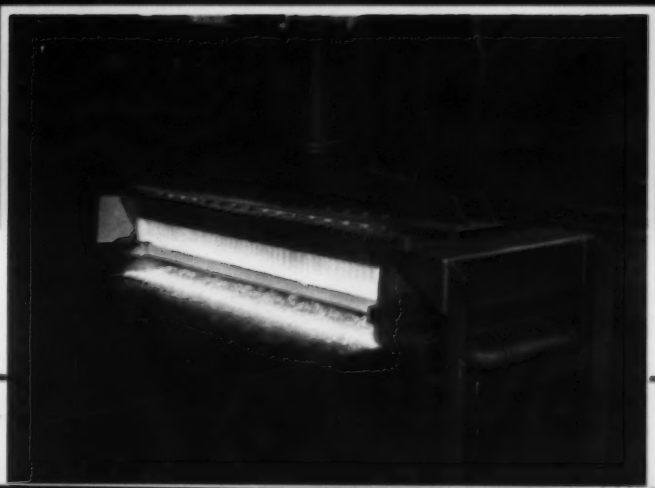
FREYN DEPARTMENT

American Ore Reclamation Section

KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

largest machine in United States

▲ View of Weirton Steel's new 8-foot sintering machine, looking toward feed end. It is the widest iron-ore sintering machine in the United States.



Inset shows ignition furnace and vibrating spreader feeder, which eliminates conventional swinging spout. ▶

Tape that sticks on both sides

Just whisk off the protective liner from "SCOTCH" Brand Double-Coated Tape to expose a *second* adhesive surface. With *two* sides of the strongest adhesive on any double-coated pressure-sensitive tape, you're all set for just about any bonding, laminating, or splicing job. Ask your "SCOTCH" Brand Tape distributor for a free demonstration, or write us for complete information.

Always specify "SCOTCH" Brand the *quality* tape . . . and *stick* with it!

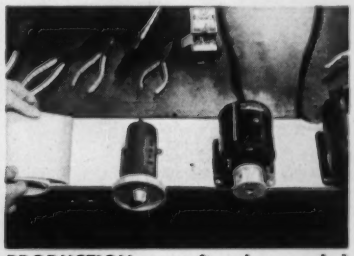
DOUBLE-COATED . . . *one of more than 300 Pressure-Sensitive Tapes for industry trademarked . . .*

REG. U. S. PAT. OFF.

SCOTCH BRAND

Look what you can do with it!

AUTOMATION on the production line: "SCOTCH" Brand Double-Coated Tape No. 666 secures electrical coils to base plate through subsequent riveting, soldering and assembly.



PRODUCTION can often be speeded with "SCOTCH" Double-Coated Tapes. Above: motors and generators held in place on test bench with double-coated tape. Tape eliminates bolting and unbolting of units.

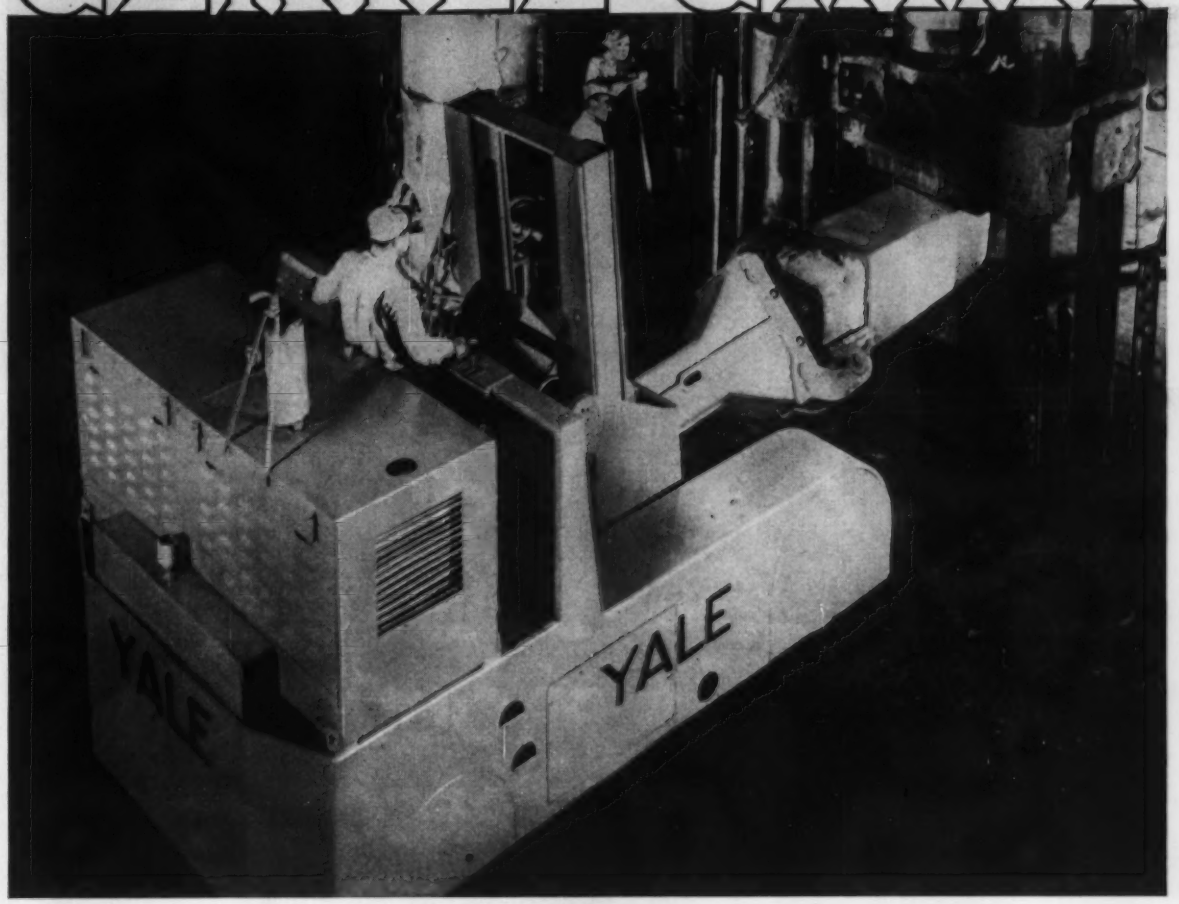
BONDING, laminating, and splicing operations can often be speeded and simplified with "SCOTCH" Brand Dispenser H-125. Dispenser strips protective liner from tape; rolls it neatly; has built-in cutter.

FREE FOLDER shows many additional ways "SCOTCH" Brand Double-Coated Tapes can save time and money and solve production problems for you. Write on your letterhead to 3M Co., Dept. GK-26.

The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

© 3M Co., 1956.

GENTLE GIANT



YALE SHOCKPROOF ACTION EASES OPERATOR'S JOB

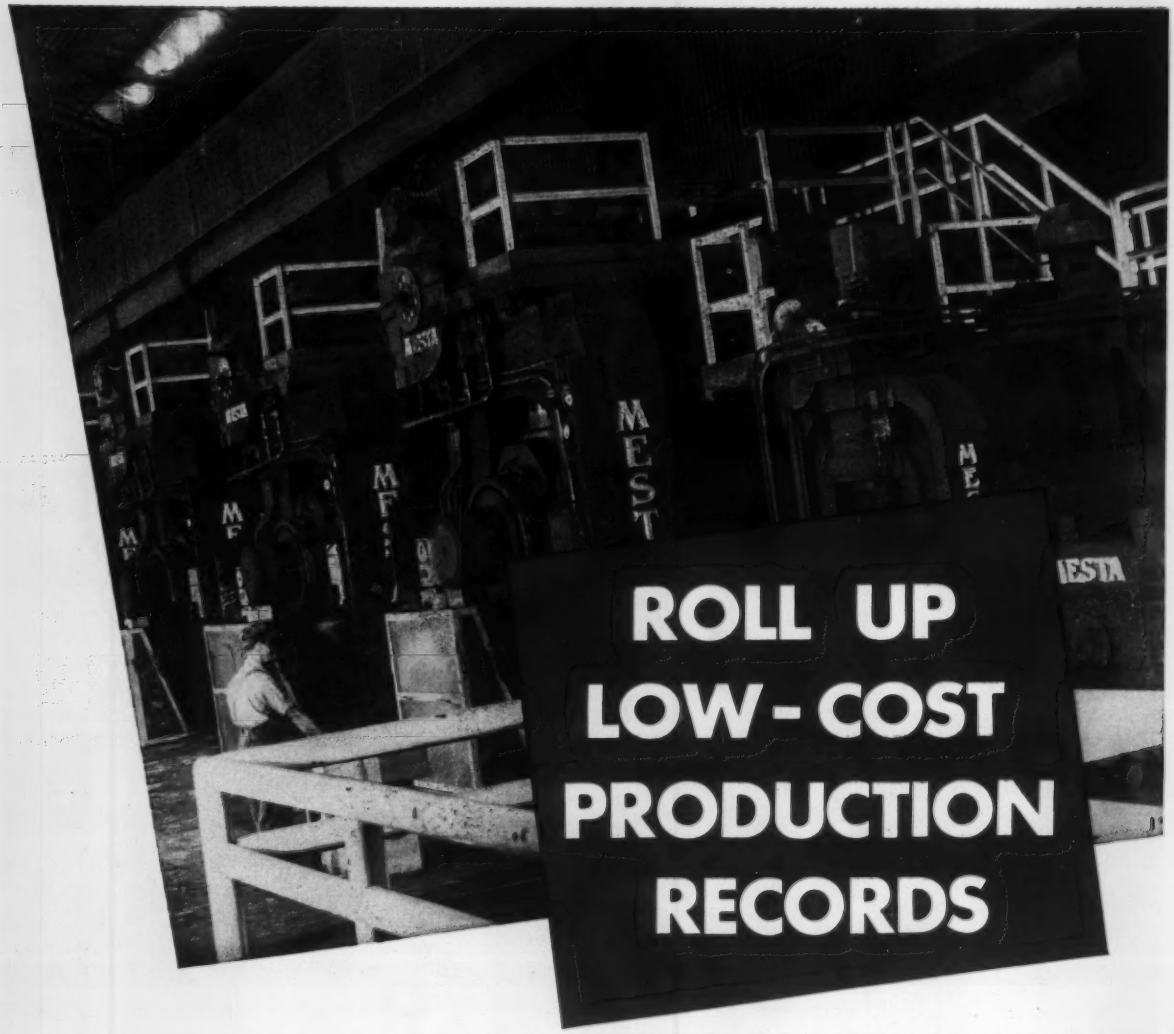
With a special ingot-revolving attachment, this Yale Giant Handler speeds forging of huge multi-ton ingots without handling shocks to load or operator. Smooth action is typical of all Yale Materials Handling Equipment—engineered for maximum safety and ease of operation.

Particularly in the metals industries, where the variety of handling needs is great, Yale meets the demands for specialized handling equipment. The complete line of electric trucks (up to 100,000 lbs. capacity) and gas or diesel trucks (up to 10,000 lbs. capacity) offers safe and easy handling of large dies, coils of steel, huge bars, sheet stock and other materials. Find out which Yale trucks are best suited to your handling operation and how they can cut handling costs for you. For full information write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. 82.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U.S. PAT. OFF.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists



WITH *Texaco Regal Oil* in roll stand circulating systems, production goes up because performance is dependable and efficient at all times. This turbine-grade oil reduces maintenance costs too, by giving oil film bearings maximum protection and keeping oil lines clean for constant lubrication.

Texaco Regal Oil has exceptional resistance to oxidation and emulsification, thus assuring sludge-free systems. Its protective lubricating film prolongs bearing life and assures normal temperatures—even under the heaviest loads.

To keep enclosed reduction gears running smoothly and more efficiently at low upkeep cost, use *Texaco Meropa Lubricant*. It retains its stability under extreme pressures . . . resists oxidation, thickening and foaming . . . greatly extends gear life.

You can get peak performance and hold costs down at every step of your operation by employing effective lubrication. Any Texaco Lubrication Engineer has all the information you'll need. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

Metalworking Outlook

Harmony and Discord

Old-style jurisdictional disputes and interunion rivalries were aired at Miami Beach, Fla., last week when the AFL-CIO executive council met. Top-level harmony still reigns, but sour notes are coming from lower levels. Example: Walter Reuther's autoworkers are hassling with an old AFL building trades group over work division at Studebaker-Packard Corp.'s Detroit plant. Conclusion: The merger is by no means threatened now by such problems, but it will be if they remain unresolved.

Balance of Power

Will the AFL-CIO merger necessitate industrywide bargaining as protection for the small firms? Delegates to an American Management Association meeting in Chicago last week got two views. Said Edward L. Cushman, American Motors Corp. vice president: "In some types of activities industrywide bargaining may be desirable, but not in the auto industry as Henry Ford II has proposed. It would lead to cartelism, collectivism, government regulation." Said John S. Bugas, Ford vice president: "Management of all companies should be exploring all the possibilities of balancing power at the bargaining table. Pressure by unions for codetermination of management policies will continue."

New Formula for Setasides?

Business & Defense Services Administration will try to work out a new formula to determine mill setasides for steel. The decision to attempt a new method follows complaints from the Defense department and the Atomic Energy Commission that defense contractors are having trouble placing defense orders for delivery in the first and second quarters. The trouble arises from a decision by BDSA to reduce the setasides because identified deliveries of steel to defense contractors have lagged below the setasides for most shapes and forms of carbon steel.

Good Business in Chicago

Chicago area purchasing agents report that estimated capital expenditures for 1956 may top the money spent in 1955 by $35 million. Other conclusions indicated in a survey by the Purchasing Agents Association of Chicago: Deliveries are faster; prices are edging up; inventories in January climbed after remaining stable for three months; production and employment are stable; order backlogs are increasing slightly.

Prospects for Scrap

Domestic consumption of purchased scrap may reach 35 million gross tons in 1956, compared to 34 million in 1955. So predicts Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel Inc. The 1-million-ton increase "would offset what now appears to be a moderate

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shrinkage in overseas requirements for scrap. Hence, 1956 may be another 38 to 39-million-ton purchased scrap year."

Growth in Aluminum

By 1960, 28,000 companies will be aluminum processors or product manufacturers, compared to 24,000 now and 4500 in 1945. Kaiser Aluminum & Chemical Corp. points out that 1500 new firms are joining the industry annually. Most of the 24,084 firms in the field now buy aluminum sheet, rod, bar, extrusions and forgings which they fabricate into end products.

Corporate Tax Agreement

Democrats and Republicans are in agreement to extend existing excise and corporate income tax rates for another year from Apr. 1, 1956. Both parties have introduced identical bills that carry out the President's recommendations for the extension.

Canada: Pinch in Steel

Canadian fabricators see little prospect for relief from the pinch in steel. The shortage is so bad that steel mills themselves have trouble filling their own expansion needs. The dip in auto production has had little effect, since Canadian automakers use only 7 per cent of domestic steel output, compared with almost 25 per cent in the U.S. And as 17,000 workers have just settled a five-month strike with General Motors of Canada, auto production and steel consumption promise to pick up.

Expansion in Germany?

West Germany urgently needs to expand its steel capacity, say experts. Mills are falling far short of filling the strong domestic demand. Result: In contrast with France and some other European Coal & Steel Community countries, Germany has become a net importer of steel. And ECSC is lagging in the production race with the Soviet bloc. ECSC produced 57.6 million net tons of steel last year, compared to the Soviet bloc's 68 million. By 1960, Soviet production will be stepped up to 88 million tons. To keep pace, ECSC will have to boost output 50 per cent in the next four years.

Straws in the Wind

Rep. Adam E. Powell (Dem., N. Y.) wants an amendment to the bill providing more than $1 billion in federal aid for school construction so that the grants would be limited to nonsegregated schools; if such an amendment passes the House, odds are it would be killed in the Senate . . . Hearings on the 7 per cent rail freight increase started last week . . . Burroughs Corp. will now lease as well as sell its business machines . . . Westinghouse Electric Corp. will start up color TV lines at Metuchen, N. J., in midyear . . . Square D Co. will spend $9 million on expansion through 1957, equaling investment in new plants from 1945 through 1955.

MULTIMET alloy wraps are joined by welding in the fabrication of aircraft cabin heaters.

MULTIMET Alloy Wraps Absorb the Heat from a 3500 deg. F Flame

MULTIMET alloy wraps are used to absorb the intense heat from burning aviation gasoline in aircraft cabin heaters. The spirally wrapped alloy sheet transfers the combustion heat to fresh ventilating air. Very thin sheet — only 0.025 in. thick—does an excellent job here despite the high metal temperatures and the oxidizing conditions.

Rigorous 1,000-hr. tests were conducted before MULTIMET alloy was selected for this job. It has now been the standard material for seven years. The excellent high-temperature properties of the alloy made it possible for designers to use thin sections, which insure a light, compact heater, with excellent heat-transfer efficiency.

MULTIMET alloy is one of many HAYNES high-temperature alloys for economical use over a wide range of operating conditions. It has given good service for engine manifolds, turbine blading, heat-treating equipment and many aircraft components. For a copy of a booklet describing HAYNES high-temperature alloys, and for prices and sizes of MULTIMET alloy, get in touch with the nearest Haynes Stellite Company office.

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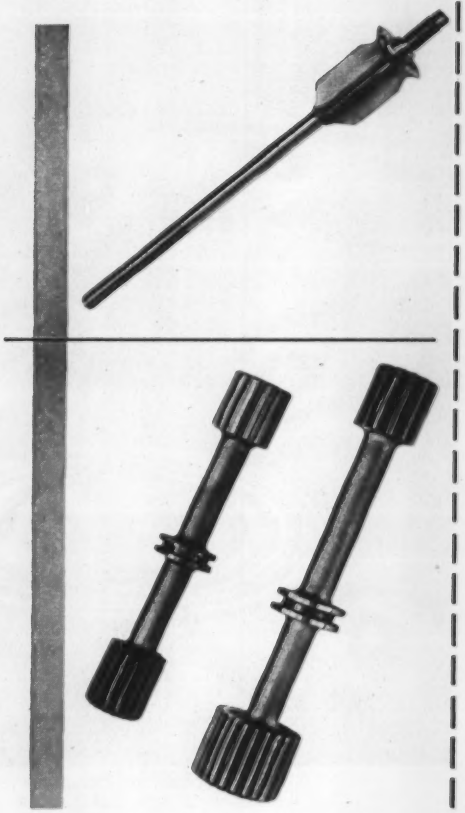
"Haynes" and "Multimet" are registered trade-marks of Union Carbide and Carbon Corporation.

Type 431 Stainless

Armco 17-4 PH

Stainless steel discs hardened to Rockwell C40 to 41 looked like this after heat-treating.



How Armco 17-4 PH Stainless Steel cured these heat-treating headaches

These parts were causing plenty of headaches for heat treat and the rest of the shop until they were made of Armco 17-4 PH Stainless Steel.

High temperatures required to harden grades formerly used caused severe distortion. This meant heat treat was saddled with costly, time-consuming straightening operations—plus the job of removing heavy scale.

Armco 17-4 PH eliminates these shop headaches. Distortion and scaling don't occur because this unusual high strength stainless steel can be fully hardened by heating at only 850 to 900 F for 1 hour and air cooling. With this low-temperature heat treatment, parts remain within tolerances and have only a light heat-tint discoloration.

These cost-cutting advantages also mean that you usually can finish-machine Armco 17-4 PH stainless parts before heat treatment. You don't have to reroute to the machine shop for finishing in the hardened condition.

If you are making hardened parts for corrosion resistant applications, Armco 17-4 PH Stainless Steel may help you cut costs and boost production.

Write us for complete information on this special easy-to-harden stainless steel. It is available in billets, bars and wire. Also ask about Armco 17-7 PH Stainless—produced in sheet, strip, plate, bars and wire.

ARMCO STEEL CORPORATION

976 CURTIS STREET, MIDDLETOWN, OHIO

ARMCO®

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

It Could Happen Here

America's industrial base for defense is not geared for all-out war. Our precarious position was revealed with startling clarity at the machine tool hearings before the Senate's Small Business Committee in Washington several days ago.

Sixty per cent of the Navy's machine tools were made in World War II or earlier. This branch of the service is spending only $300,000 in fiscal 1956 to replace obsolete tools. In line with industry practice, it should be spending $12 million.

Half the Air Force's tools are in the 10-to-15-year age bracket. Yet it turned back $84.6 million earmarked for new machines. Many of the tools in the Army's reserve were designed to do special jobs that no longer exist.

There is a growing realization among the services that too much of their equipment predates the carbide tool age and can't produce the close tolerances called for by modern weapons. The Navy says it costs $1,224,000 a year to operate 117 outmoded turret lathes. It could do the same work with 34 new machines at an operating cost of $484,000.

It is inconsistent to have radar screens and reconnaissance planes scanning the skies for a surprise attack while not enough of the Defense department's expanded budget ($35.5 billion) is earmarked to offset gnawing obsolescence —let alone provide the adequate production capacity proposed by the Vance Plan.

Habitually, this country has entered war poorly equipped. We have lacked the right type of machines required to make the quantity of modern weapons needed to win.

Germany and Japan started World War II with a tremendous, specialized industrial potential. Fortunately, at the outset it was directed toward the production of weapons for fighting on the ground. This gave a naive but ingenious America time to build the plants and machines required to overtake the aggressors.

America literally lifted the war from the ground to the air by developing superbombs and superbombers that left her adversaries helpless. President H. G. Boden of AEG (often referred to as the German counterpart of General Electric Co.) told us that his company had 36,000 machine tools. The Soviets took 25,000; 8000 were damaged by bombings and were useless; 2000 were partially damaged; and only 1000 remained for postwar use.

The decision in the next war will be quick. Its outcome will depend on what we have ready when it starts. What happened in Germany could happen here—but on a more devastating scale!

Irwin H. Such

EDITOR-IN-CHIEF

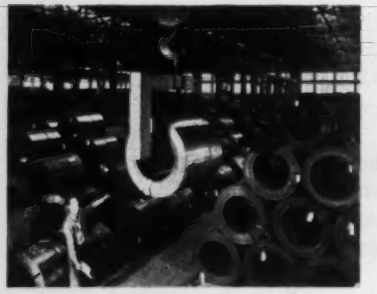
STEEL BUYERS GUIDE
to Ryerson Products and Services

You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

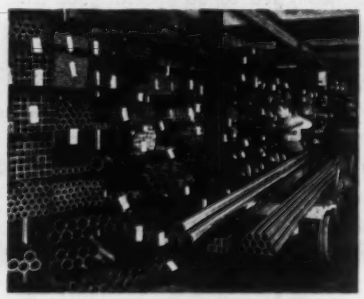
BARS—The most complete range of types, shapes and sizes as well as the largest tonnage.

STRUCTURALS — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.

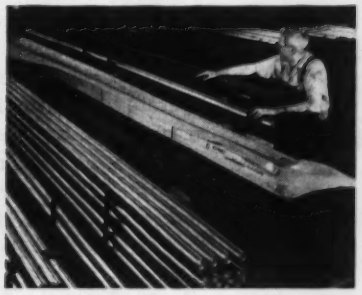
PLATES—14 types including special low carbon plates for forming and welding, leaded E-Z-Cut, etc.



SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.

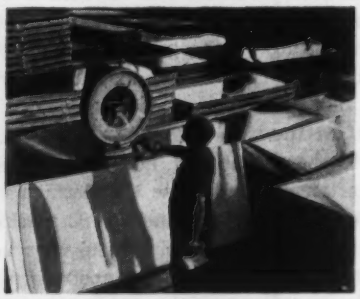


TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

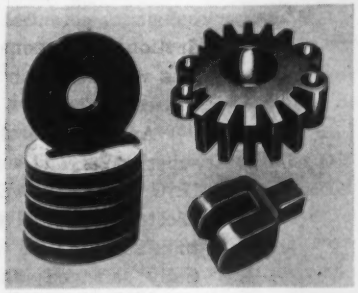


C. F. BARS—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.

ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



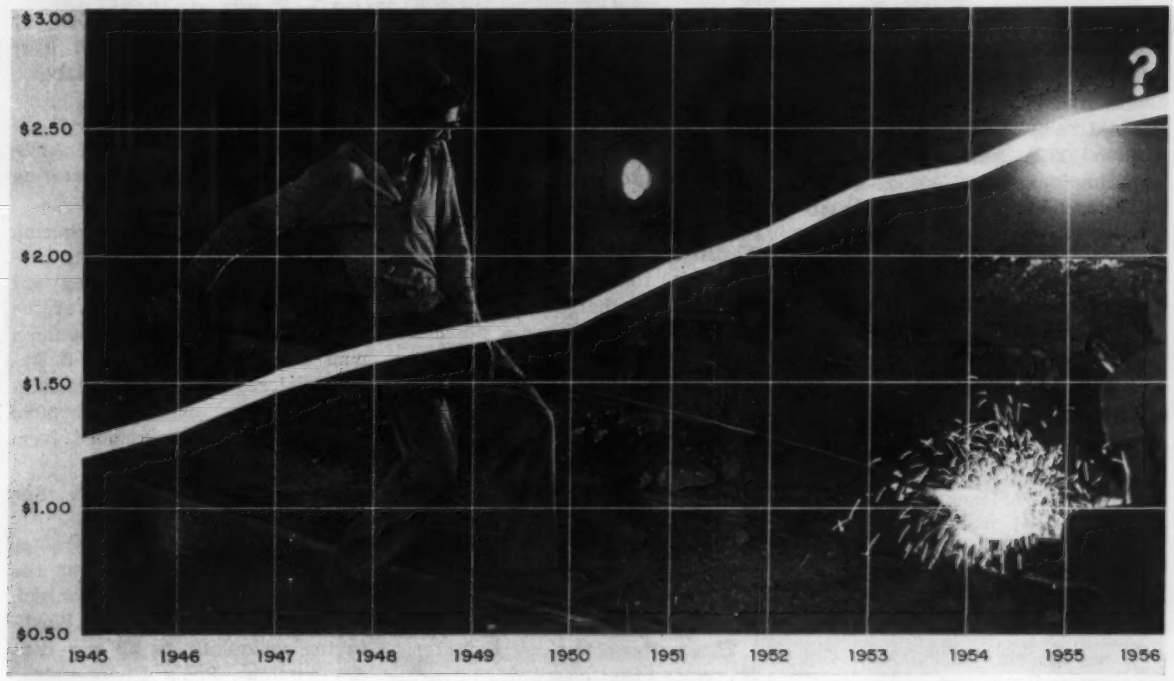
STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.



FLAME CUTTING—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Photos: Kaiser Steel. Figures: AISI

Average hourly steel pay will rise in '56 as . . .

Steel Braces for Labor Talks

WRITER-ACTORS are writing their lines and studying their parts for what is almost certain to be the major labor-management drama of this season.

The opening of steel negotiations is still some three months off. Despite aggrieved protests from Steelworker President David J. McDonald ("we don't know yet what we're going to demand") and silence from steel company executives ("no comment; no quotes, please"), a general idea of the plot line is already apparent.

Money—The union will achieve dramatic effect with a surprisingly large wage demand. It will claim that record steel company earnings in 1955 warrant a big increase. What will it settle for? Six cents is the rock bottom figure because that's what the autoworkers will get this year.

The company argument will be that the record earnings are needed to help finance the record $1.2-billion expansion in 1956, and that steelworkers are already among the best paid in all U. S. industry (see chart). They averaged $2.50 an hour in 1955 and in the last three months of the year averaged above $2.60. That's not counting another 20 cents for pensions, social security and insurance.

SUB—Mr. McDonald is committed to ask for supplemental unemployment benefits. But he must have noticed the trouble Walter Reuther has had selling the plan to the autoworkers, especially the high-seniority and craft personnel. The Ford-type plan with its pooled funding offers little to a man who isn't likely to be laid off. And he's traditionally more influential in the steel union than in the autoworkers' organization.

The steelworkers, as a result, may ask for a vested type of SUB such as that won by the glassworkers last year. That plan sets up an individual fund for each worker. High and low-seniority workers and skilled and unskilled get equal benefits. But odds are against acceptance of that plan now. In a cyclical industry like steel, the glass-type SUB is more expensive than the Ford variety.

Weekend Premium Pay—Here's an issue that may spark a stormier climax than any other in the play. A steelworker now gets premium pay on Saturday and Sunday only if they happen to be his sixth or seventh successive day of work. The union wants time and a half on Saturdays and double time on Sundays, no matter how many previous days a man may have put on the job.

Nobody yet can or will reveal what such a deal would do to steel labor costs, but even the union concedes that premium weekend pay "may cost the companies more than" SUB.

Full Union Shop—The industry has a modified union shop. One of the little publicized provisions of Walter Reuther's auto contracts

last summer was General Motors' agreement to the full union shop. Ford has had it since 1941.

The steelworkers long have wanted the full shop, and the auto provision may help them get it.

Vacations, Holidays—Mr. McDonald will ask for more, of course. This demand will be a "trading" one. The outcome here will depend on how the negotiating on other matters goes.

Seniority—Adjustments are made in these provisions every time they're subject to negotiation. In the day-to-day workability of the contract, they're vital. But changes will be relatively minor.

Insurance, Pensions—Technically, insurance discussions need not be started until late 1956 after the bulk of the contract expires. And pensions need not be negotiated until 1957. To get all provisions expiring at the same time, insurance and pensions may be included in the May-June talks.

If so, the big pension issue will be over vesting the pensions (putting each pension into an individual account). That was granted in the auto contract, another little-publicized provision.

Influence—Steel is far and away the most important labor negotiation this year. But it will be influenced by some of the other settlements that have been or will be made early in 1956. The biggest one is in the oil industry where a 6-per-cent wage formula was worked out. That amounts to at least 15 cents an hour in higher wages. Talks between various aircraft companies and the machinists and auto workers are under way. Demanded is a 10-per-cent wage hike. The influence of the Westinghouse situation may be to emphasize to both labor and management the horrors of a long strike. Odds now favor a peaceful solution in steel.

Two pacts signed last year probably will have the strongest effect on steel negotiations. John L. Lewis' contract calls for a wage boost of 80 cents a day on Apr. 1. The autoworkers will get a 14-cent package this year—6 cents for an annual improvement increase, 5 cents for SUB and 3 cents in other provisions.

The writer-actors in the steel drama may use those two as rough standards for their own contract, which, incidentally, will probably have a two or three-year run.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

GE X-Ray Unit Measures Submicroscopic Damage

Changes as small as a billionth of an inch in the distance between crystal facets are detected by the double diffraction spectrometer designed by General Electric Co. engineers at the Atomic Energy Commission's Hanford plant

Basis for Recruiting

AFL-CIO gets figures showing where to find 30 million new members among unorganized

STATISTICS on recruiting possibilities were laid before the AFL-CIO's Executive Council meeting in Miami Beach, Fla., last week.

The merged union's organizing director, John W. Livingston, submitted a document pointing out that more than 30 million of the approximately 42 million nonunion men and women in the U. S. are potential recruits. Of the remaining 12 million, many are farmers and self-employed—excluded from the organizing plans.

Geography—A large percentage of the 30 million are in the South. In North and South Carolina, for example, only 9 per cent of the potential members are organized, compared with the state of Washington where 40 to 50 per cent are in unions. Pools of unorganized workers remain in such highly industrialized states as Michigan, Illinois and New York, the report claims.

Mr. Livingston says that more than 1 million unorganized workers are employed in the lumbering and woodworking industries.

By-Passed — The report ducks the issue of what AFL-CIO union should have jurisdiction in organizing such people. One observer says that the woodworkers represent fair game for five different unions.

The AFL-CIO has about 15 million members, so it stands at one-third of its potential strength.

UI Payments Hit New High

Jobless workers covered by the federal-state unemployment insurance program received an average $26.10 a week in December, an all-time monthly high, says the Labor department.

The average size of the payments has been rising the last two years. State legislatures have increased payments and the duration of the benefits. December payments were $1.76 higher than in December, 1953, and 88 cents higher than in December, 1954.

In Defense Work, Contract Packagers Will . . .

1. Help you bid successfully for a contract
2. Provide up-to-date information on military requirements, new packaging processes and materials
3. Supply equipment, labor and materials to meet government specifications
4. Pick up items at your door, package them and handle shipments to customers
5. Take care of all government paperwork and inspection

Package Deal for Industry

CONTRACT PACKAGING, one of the "war baby industries," is showing signs of maturity.

When Continental Packaging & Processing Inc., Chicago, was formed three years ago, officials set up facilties they believed adequate for steady, modest annual expansion. Business increased steadily, but hardly modestly. "We've outgrown our building already," says Herbert Jackish, executive vice president, "and a new one is in the offing."

Growth—Continental P & P is not the exception. Growth among 75 contract packagers surveyed recently by the Commerce department averaged over 300 per cent in the last five years.

Contract packagers concentrate primarily in two areas—defense work and export. Their major selling points: 1. Up-to-date knowledge of defense and export packaging requirements. 2. Labor, materials and facilities needed to package according to those specifications.

Impetus — Contract packaging has been around for 50 years, but rigid defense packaging requirements during World War II, gave the industry its real impetus. While many companies were placing their major emphasis on production, specialists cropped up to take over their defense packaging. Many "fast-dollar" operations have dropped by the wayside, leaving a small core of packagers intent upon becoming a permanent part of the industrial scene.

Factors fostering the postwar growth: New containers and packaging materials, new machinery and new products, plus the general industrial expansion.

Trouble — Many a metalworker has only "guesstimated" his packaging costs in submitting a bid on a defense job only to learn too late that the packaging required would cost 22 cents on each item that cost only 6 cents to make.

Result: Many companies are calling in contract packagers to get a fixed packaging cost to add to their manufacturing bid.

Reason Why—For most metalworkers today, defense contracts total less than 10 per cent of the over-all production volume. Setting up special packaging operations—personnel, equipment and space—for short-run defense orders is expensive. That's why, when all costs are considered, the contract packager can often do it cheaper.

Most contract packagers, too, offer pick-up service for your items. Because many packagers specialize in certain types of jobs, they have cleaning and coating equipment necessary to meet the two and three-year storage specifications of the military.

Methods—H. J. Peacock Co., Chicago, has worked with several companies in the defense tool lay-away program. This packager has master mechanic crews which can come in, dismantle the machine and prepare it for storage on company premises or for shipment to military depots. Contract packagers' equipment usually includes vacuum and air-tight sealing machines, too.

Other important factors in defense work: Contract packagers usually have resident military inspectors who are on hand daily to check specifications; packagers also take care of government paper work—a major headache for many manufacturers. Handling shipments to customers after packaging is also part of the service.

Future—While 90 per cent of the metalworking work done by contract packagers is in defense items, many are trying to develop the commercial field. Growth envisioned by aggressive packagers:

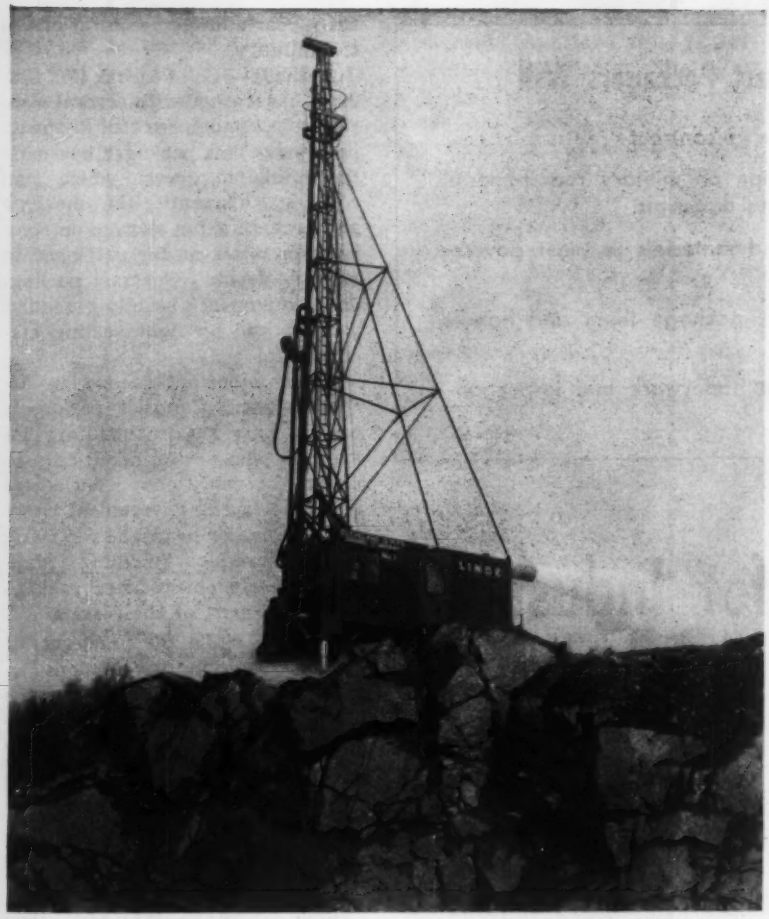
1. Contract packagers will take on more and more special orders and overproduction runs, similar to subcontracting practices in production.

2. As packagers develop their skills and reputations, manufacturers will "farm out" all their packaging and devote the factory space saved to expand production facilities.

Uranium Supply Uncertain

"It would be desirable for the uranium and power industries to undertake a joint study of the potential uranium supply and demand, so that both industries could do some long-range planning," says Jesse C. Johnson, director, Division of Raw Materials, Atomic Energy Commission.

Citing the inability to predict discoveries of uranium deposits, as well as the demand for uranium, Mr. Johnson states the AEC does not know whether there will be a uranium procurement program after Mar. 31, 1962. Estimates of nuclear power capacity in the U.S. by 1980 range from 50 million to more than 100 million kw, depending on the assumptions made about the cost of generating electricity.



With a supersonic scream, this jet piercing machine melts blast holes in rock at the Republic and Empire mines. Without the machine, jasper mining operations would have been impossible, Cleveland-Cliffs Iron Co. says

Jasper Comes Of Age

FOUR STEEL companies have joined Cleveland-Cliffs Iron Co., Cleveland, in the first major project for the complete treatment of low-grade Michigan ores, locally called "jasper" as contrasted with Minnesota taconite.

Inland Steel Co., Chicago, will own 20 per cent of the Marquette Iron Mining Co., organized by Cleveland-Cliffs to operate the project, which includes two mines (the Republic and the Empire) near Marquette, Mich. Cleveland-Cliffs holds a 47.5-per-cent stock interest.

Speculation—Other steel firms participating in the project will be named within 30 days, following formal O.K.'s by the boards of directors concerned. It is reported that International Harvester Co. is considering joining the project. The Ford Motor Co. is not involved. It and Cleveland-Cliffs jointly own a jasper beneficiation plant at Humboldt.

Cleveland-Cliffs pioneered the enrichment of low-grade ores in Michigan when it began separation and concentrating operations at the Humboldt mine, near Ishpeming, in 1951.

Advantageous—P. D. Block Jr., senior vice president of Inland, termed the Marquette operation the most advantageous of the low-grade projects from his company's point of view. It is Inland's first venture into iron ore concentration.

Ore shipments will be through Lake Michigan ports, such as Escanaba, thus avoiding the costly traffic congestion at St. Marys river and Soo Locks.

Open Pits—Usable ores outcrop at both the new mines, and explorations indicate open pit operations will be possible to a depth of 500 ft or more.

At Republic, less than 2 tons of rock will yield a ton of concentrate 60 per cent or more iron. About two and one-half tons of rock will produce a ton of 60-percent iron content at the Empire mine.

Impurities at Republic are so coarse they can be freed by grinding to pass a 65-mesh screen, compared with the 325-mesh or finer screen required by taconite.

1.5 Million Tons—Each of the mines is estimated to be capable of an ultimate output of 1.5 million tons of concentrates annually.

Crushing, grinding and concentrating plants are being built at each mine. Pelletizing for both mines will be done at an agglomeration plant under construction at Negaunee. The first 500,000-ton unit will go into production later this year. Additional units of the same capacity are scheduled for 1958, 1961 and 1964.

AEC Receives Proposals

The Atomic Energy Commission has received these seven proposals to develop, design, construct and operate small capacity nuclear power plants:

1. Chugach Electric Association, Anchorage, Alaska, and Nuclear Development Corp. of America, White Plains, N. Y., sodium-cooled, heavy - water - moderated reactor, 10,000 kw. 2. City of Holyoke Gas & Electric Department, Holyoke, Mass., gas-cooled reactor with closed-cycle gas turbine, 15,000 kw. 3. City of Orlando, Fla., liquid metal fuel reactor, 25,000 to 40,000 kw. 4. City of Piqua, O., organic moderated reactor, 12,500 kw. 5. Rural Cooperative Power Association, Elk River, Minn., boiling water reactor, 22,000 kw. 6. University of Florida, Gainesville,

Fla., pressurized water reactor, 2000 kw. 7. Wolverine Electric Cooperative, Hersey, Mich., aqueous homogeneous reactor, 10,000 kw.

AEC O.K.'s Private Atom Tests

Babcock & Wilcox Co., New York, announces that it has been granted the AEC's first permit for an installation to test nuclear reactor cores.

The "critical experiment facility" will be built at B&W's atomic fuel element fabrication plant near Lynchburg, Va. Both facilities will be completed this April. B&W will use the plant to test theories and calculations concerning full-scale atomic reactors.

Defense Spending Lags

Government obligations for aircraft and guided missiles are still lagging in fiscal 1956, reveals the Defense department's latest report on status of funds. In the five-month period ended Nov. 30, 1955, the Defense department deobligated about $65 million more than it obligated. The Air Force deobligated $373 million more. It has $9.3 billion in unobligated aircraft funds.

The Defense department obligated $284 million for guided missiles. It still has $1.5 billion left to spend this fiscal year. The Air Force let contracts for just over $71 million.

Freight Car Tax Write-Offs

From Jan. 12 through Jan. 25, the Office of Defense Mobilization issued certificates of necessity for accelerated tax amortization totaling $147,883,850. Fourteen firms received write-offs on freight and tank cars: Union Tank Car Co.; Illinois Central Railroad; Central of Georgia Railway; Chicago & Eastern Illinois Railroad; St. Louis Southwestern Railway; St. Louis-San Francisco Railway; Chesapeake & Ohio Railway; Detroit, Toledo & Ironton Railroad; Louisville & Nashville Railroad; Great Northern Railway; Pecos Valley Southern Railway; Reading Railroad; Southern Pacific Railroad; New York, New Haven & Hartford Railroad.

Automated line makes 12 auto wheel discs a minute

Automation Adds Flexibility

"AUTOMATION? Sure we want it. But give us flexibility, too, so we can keep the equipment operating full time."

That's a plea tool builders are heeding. One example is the press line built for Dunlop Rim & Wheel Co., Coventry, England, by the Clearing Machine Corp. Division of U. S. Industries Inc.

Built to produce auto wheel discs, the line has four presses, plus a feeding mechanism that integrates them into an automated line.

It's Flexible — Wheel design changes in years to come can be accommodated.

Additional presses can be added to the line easily. The line can be taken apart and put together in different combinations, as two-press and three-press units.

Presses can be run independently of each other without the automatic feed. Hand feeding can be done from the front or back.

On the Line—The lead press has a capacity of 275 tons; the other three have 600 tons of capacity. All are one point, single-action presses equipped with Clearing's overload protection device and positive cam knockouts in the slides.

Production Stages—1. Cupping of the 14 x 14⅞-in. blank. 2. Reverse forming. 3. Edge cupping, piercing the bore and belt holes. 4. Hole sizing and undercutting the bosses.

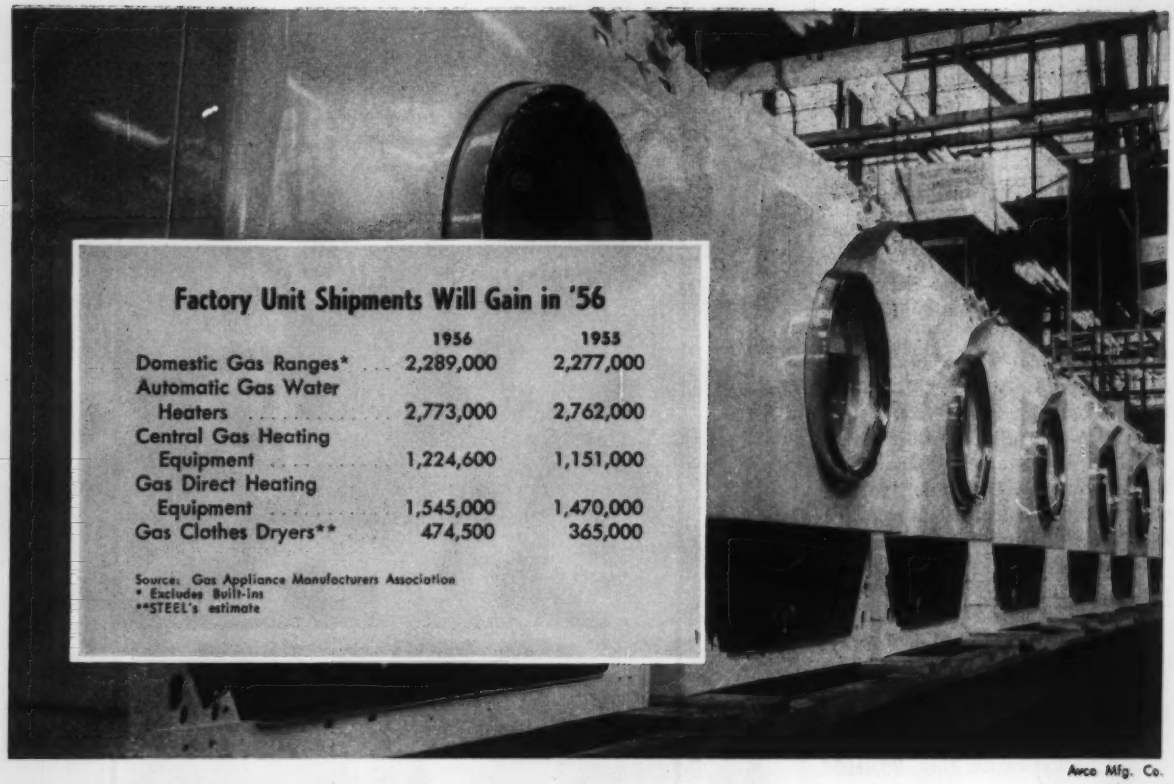
Blanks are fed from a basket by pushbar into the transfer mechanism.

Seventeen sets of transfer fingers move the parts through the 19 stations of the line. Included in the line are two 180-degree flip-over devices; only one is used in making the wheel discs.

Increase West Coast Shipments

Republic Steel Corp. hopes to increase steel shipments to the Far West this year with an increase in production at its Gadsden, Ala., operation.

Republic sold about $32 million in steel products last year to the Far West, 2.5 per cent of its total sales.



Factory Unit Shipments Will Gain in '56

	1956	1955
Domestic Gas Ranges*	2,289,000	2,277,000
Automatic Gas Water Heaters	2,773,000	2,762,000
Central Gas Heating Equipment	1,224,600	1,151,000
Gas Direct Heating Equipment	1,545,000	1,470,000
Gas Clothes Dryers**	474,500	365,000

Source: Gas Appliance Manufacturers Association
* Excludes Built-ins
**STEEL's estimate

Avco Mfg. Co.

More of these and other units may roll off lines in '56 for . . .

New Highs in Gas Appliances

"THE PAST YEAR was the biggest in the history of the gas appliance industry and 1956 is sure to set new all-time records," predicts W. F. Rockwell Jr., president, Gas Appliance Manufacturers Association.

A composite of manufacturers' estimates indicates that total industry volume will increase 2.5 per cent, explains GAMA.

Examples—Dearbon Stove Co. reports: "Sales of gas space heaters showed an increase in 1955 of about 10 per cent. Outlook for 1956 is for about the same jump." Servel Inc. is even more optimistic: "Gas refrigerator sales for 1955 were 19.5 per cent higher than those of 1954. Our sales this year are expected to be 53 per cent over last year's." Century Engineering Corp. estimates: "Our 1956 sales of gas home heating equipment should exceed last year by 10 per cent." George D. Roper Corp. explains that its gas range sales will rise 20 per cent over the 20 to 25 per cent gains registered in 1955. And gas dryer sales will climb another 30 per cent, say industry spokesmen.

Not everyone is optimistic: Says Cribben & Sexton Co.: "Industry sales in 1956 should drop about 5 per cent . . . we expect our sales to increase as our company was hampered last year by a strike during an industry sales program."

Fewer New Homes—What effect will a drop in new housing starts have? Reports Crosley & Bendix Home Appliance Division, Avco Corp.: "If housing starts and automobile sales both fall under 1955 levels, we expect over-all gas appliance volume to increase substantially . . . when major investments like automobiles or new homes are not made, there is a greater expenditure of consumer dollars in appliances." One group may suffer: Built-in gas range sales are made almost exclusively to new home builders and contractors.

Considerations — One of the major stumbling blocks facing the gas appliance industry is the lack of gas mains in areas where large home building projects exist. Says one manufacturer: "While liquefied petroleum gas is almost always available, its cost can be the offsetting factor where electric rates are low."

Other problems to be solved: 1. The specialty manufacturer (most gas appliance makers fall in this category) is handicapped when complete kitchens are sold in a package deal. 2. Reports Whirlpool-Seeger Corp.: The failure of the dealer to sell the advantage and need of venting the dryers at the time he makes the sale. 3.

"Dealers must concentrate more on home modernization which probably is our greatest untapped market for additional gas home heating equipment," explains Williamson Co. 4. Full-line manufacturers are taking away some distributors by introducing exclusive franchise deals.

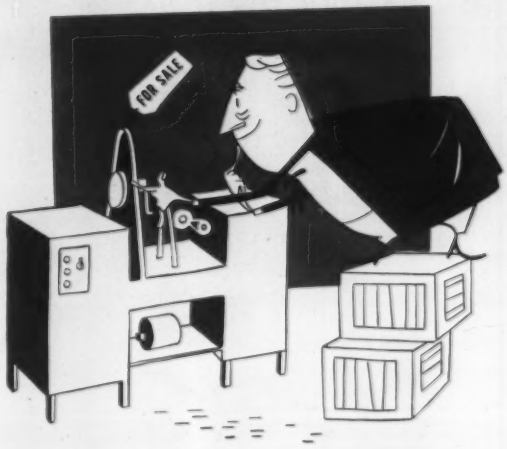
The greatest area for improvement lies in standards set by the gas utility company. Each utility has its own set of standards and specifications for gas furnaces etc. Producers also must stock various kinds of controls to satisfy gas utilities in various geographic areas.

The gas appliance makers have no recourse but to meet the specifications set up by each utility. Reason: If the utility refuses to approve a unit, the company cannot install its products. Prices are affected, too.

Progress—But there is a growing spirit of co-operation between gas appliance makers and utility companies. Servel's optimistic forecast is based on the fact that the disadvantage of an installation cost is being offset by free installation—at no cost to the dealer or consumer — by local utilities. Servel's new "elements of a sale plan" is now being used by gas utility companies which serve over 40 per cent of the nation's residential gas meters. It provides free installation, service and no recourse financing for dealers by the gas utility companies.

Research—Gas air conditioning continues to take research dollars. Explains A. O. Smith Corp.: "We have been engaged for some time in an extensive research program on gas air conditioning. We believe there is a positive future for gas in this application." In other areas: 1. Gas home heating equipment is being designed in smaller packages. 2. New styling, including the introduction of color, is a must for most manufacturers. 3. In ranges, a new automatic top burner will help create more sales. 4. The gas combination washer-dryer will come into prominence soon.

There are problems to overcome, but the record year of 1955 will be overshadowed by a new sales peak in 1956.



Vance supports new Defense department concept as . . .

Senate Ponders Tool Buying

BASIC disagreement on government policy was evident at the machine tool hearings of the Senate subcommittee which opened Feb. 7.

The Defense department's new plan (STEEL, Jan. 16, p. 39)—it abandons the Vance concept of long leadtime reserve tools and puts new emphasis on buying for current production—was praised by some, panned by others.

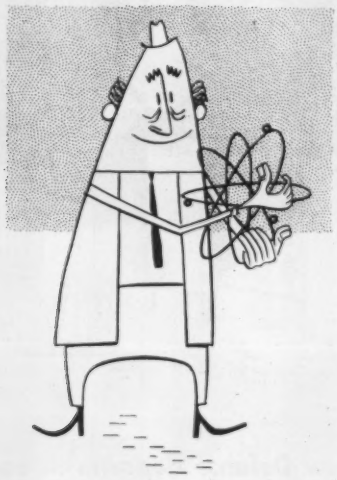
Support—Harold Vance himself endorsed the new look. "Substantial changes in war plans," he said, justify de-emphasis of the idea that stockpiled tools are more important than stockpiled weapons.

Thomas P. Pike, assistant secretary of defense, asserted that Air Force tool buying would be left substantially the same both as to dollar volume and tool type. F. H. Higgins, assistant secretary for the Army, said: "It offers basis for improvement" from present procedures.

Dissent—Sen. Edward J. Thye (R.-Minn.), chairman of the investigating subcommittee, questioned the wisdom of turning back to the Treasury $184 million allocated for long leadtime reserve tools for fiscal 1955 and 1956. Also, he asked: Is government planning adequate to insure against a machine tool crisis in another defense mobilization? Are government replacement programs adequate to keep defense tools modern?

Swan E. Bergstrom, vice president, Cincinnati Milling Machine Co., Cincinnati, representing the National Machine Tool Builders' Association, agreed that "a machine tool in use is better than one in mothballs." But he added that the industry still feels we should prepare for a Korean-type war as well as an atomic blitz. Then, he said, basic concepts of the Vance plan would still be sound. He advocated that purchase of long leadtime and other critical machines for emergency stockpile be continued.

Mr. Bergstrom said that one reason for the failure of the Vance plan was a lack of follow-through between departmental budgeting, planning and procurement. One problem with the suggested financing arrangement for the new plan: If tools are to be bought from regular departmental budgets rather than a separately allocated sum, it will be impossible to tell if enough is being done to keep tool buying up-to-date. Borrowing and current-use provisions of DOD's plan also came under fire. (See editorial, page 63.)



Civilianizing the atom is the big goal as . . .

AEC Opens Its Doors

TO SPEED development of peaceful uses of atomic energy, the Atomic Energy Commission will allow private organizations to use AEC facilities.

Projects will be considered if applicants have proper security clearance, the work won't interfere with AEC programs and the applicants have no ready access to private facilities.

Requirements—Charges for the work will be based on either full recovery of costs by the AEC, or, if applicable, going commercial rates. Users will also have to agree to patent provisions, comply with AEC regulations on health, safety and security and make arrangements to protect the AEC from claims arising from performance of the private work.

However, it will still be some time before the atom is really civilianized, even though AEC Chairman Lewis L. Strauss says that by Mar. 1 all but a small amount of information bearing on the peaceful uses of atomic energy will be available to responsible industrial groups.

Forecast — The explanation is found in a statement by Jesse C. Johnson, AEC's director of raw materials. He forecasts that it will be 1960 before industrial requirements for uranium are "significant," 1965 before they are "important." It also will be 1965, he says, before the first cost competitive atomic power plant will be in operation.

Seaway Trade Route Set Up

A trade route between the Great Lakes and Western Europe has been declared essential to the nation's trade by Clarence G. Morse, maritime administrator.

That means U. S. ship operators wanting to operate on the route will be eligible for a shipbuilding subsidy and an operating subsidy to help them meet the lower costs of foreign operators.

There are no U. S. ships operating on the route, yet, but the "essential" rating and its accompanying subsidy provisions has resulted in at least one telegram to Mr. Morse. Isbrandtsen Co. Inc., New York, wired late last week to say it was planning to apply for a subsidy on a projected service from the Great Lakes to the United Kingdom and Europe.

Here and There

The busy construction industry gets an assist from government agencies: The Civil Aeronautics Administration announces an additional $38.9 million in federal aid to airports for fiscal 1956; Defense department will put up $8 million for housing at NIKE missile sites . . . There's a good chance that the eligibility of World War II veterans for home loans will be extended three years beyond the present July, 1957, deadline . . . The Small Business Administration has a disaster loan fund of $125 million. The limit had been $25 million, but disasters of 1955 ran it through. Repayment has been extended from 10 to 20 years . . . A House Banking subcommittee studying housing advises the return of no-down-payment loans for GIs and relaxation of other housing credit. If that isn't done, it warns, a sharp slump in homebuilding is coming.

Meet Cortlandt Van Rensselaer: The new director of Business & Defense Services Administration's Scientific, Motion Picture and Photographic Products Division is on loan to the government from Hewlett-Packard Co., Palo Alto, Calif. An electrical engineer, he was responsible for production planning and inventory control at Hewlett-Packard from 1948 to 1951, is now assistant sales manager. He can be reached in Washington at the Commerce department, room 4317. Phone: STerling 3-9200, ext. 8102.

Tube Makers Please Note —

A tube mill represents a major investment. Good business practice dictates that before you invest—you should investigate.

We here at McKay believe we build the finest tube mill made today. We could point to many features that support this belief. However, these features are all a part of our determination to constantly improve the product, and to *never substitute for quality.*

Experience has proved the most expensive single item in tube mill operation is *down time.* This time lost can quickly mount into thousands of dollars — making any savings in the initial cost of equipment trivial by comparison.

Every McKay Tube Mill is designed to deliver the ultimate in PERFORMANCE, PRECISION, RUGGEDNESS and SAFETY. Compare! Investigate thoroughly before you buy and we feel sure you'll specify TUBE MILLS by McKAY.

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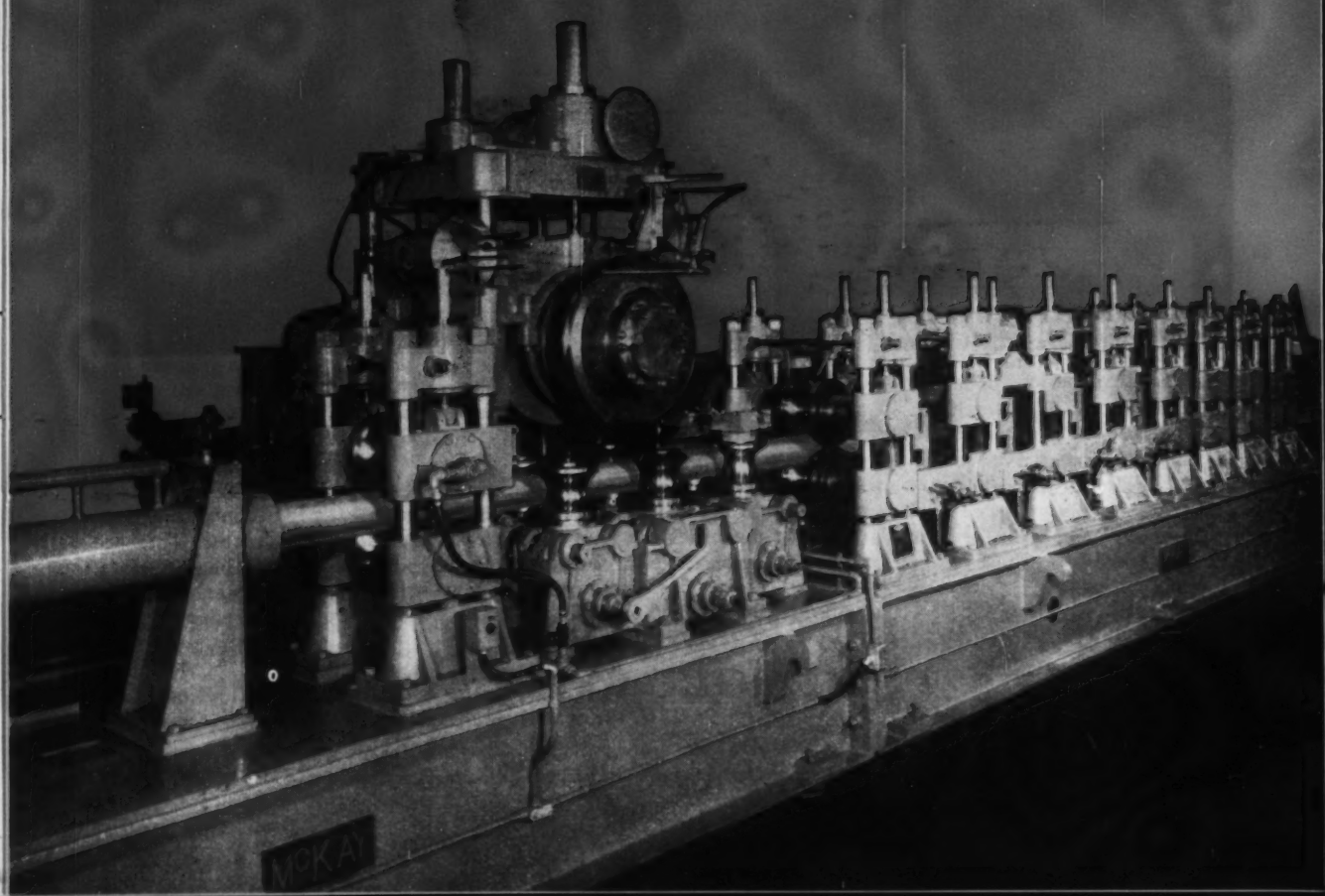

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A steady stream of packages get strapped—and nobody's there. These Signode machines do it by themselves. Not all plants are ready for such automation, but these machines are ready and are running in several plants. They are one of many Signode ways to make your product cost less to handle, store, ship and receive. For high strength at low cost, you can't beat steel strapping to hold things together or in place. It will pay you to see your Signode representative. No obligation. Just write:

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Management at Work

Dave Champion: "Ask Before You Act"

A TANNED, personable young man appeared in the STEEL editorial offices some twenty months ago and asked to talk with the editor in charge of this magazine's Program for Management series. He wanted more information on management development and management organization to help him in a new assignment.

David Joseph Champion was just back from Mexico where he had reorganized the infant Mexican branch of the Champion Rivet Co. and put it on its feet. He was looking forward to his new assignment in Cleveland. As assistant to the president, his job was to study management methods and organization and seek ways to improve them. His company, like hundreds of other growing metalworking firms, was recognizing the trend toward team management.

More Knowledge—This request for "more information" is typical of Dave Champion's approach: Learn all you can about the problem before attempting a solution. He believes in the axiom that a man's judgment is no better than his information.

After a year and a half with a task force studying the Champion organization, Dave came into a new assignment last November—manager of sales.

Markets—While wrestling with the daily problems of a sales manager new to his job, Dave again is looking for more information. This time it is in marketing research. He hopes soon to get into more scientific study of the potential for Champion Rivet's products—steel rivets, welding rods and precision forgings.

Dave represents the third generation of Champions in his company. It was founded in 1895 by his grandfather, who pioneered the introduction of open-hearth steel in rivets. Previously, rivets were made of puddled iron.

Steel rivets at first were viewed with some askance. The elder Champion offered a dollar for every Champion rivet that lost its head. Champion rivets soon became standard in building the battleships of the day and figured prominently in the construction of the Panama Canal.

Diversification — Dave's father, T. Pierre Champion, now president, led the company into the welding rod business 25 years ago, and after World War II, into precision forging.

A graduate of Notre Dame University (with time out for a stretch in the Navy during World War II), Dave Champion at 31 has seen service in production, sales and management at Champion Rivet's plants in Cleveland, Chicago and Mexico City.

He still is seeking more information.

Inco applies an old rule to better employee relations:

Know Your Competition

CHANCES are that your company's operations are complex and growing more so. How do you make your individual employees aware of their importance to the total operation?

The Answer — International Nickel Co. tackled that problem. Its solution: A continuing employee and community relations program. One sample is a recent three-day open house to: 1. Show each worker and his family the importance of his job. 2. Help civic officials understand more clearly the operations of an industrial facility. 3. Show employees that nickel has competition.

The Huntington Works, Huntington, W. Va., was the scene. This specialty mill, the largest plant in the world devoted to the production and fabrication of high nickel alloys, produces 55 different alloys for about 400 products.

Inco's reasoning behind the Open House, says John A. Marsh, vice president in charge of U. S. operations, was: "To show our 2200 employees at Huntington where we hope to go from here—if they will help us."

No Complacency—After a guided tour through the plant and a display of end products (supplied by Inco customers), employees and civic officials were shocked out of any existing complacency by a three-section display of nickel's competitive situation.

Section one showed where nickel alloys had lost to competitive materials. Section two indicated where alloys were meeting stiff competition. Section three contained applications where nickel alloys were still king.

Employees not only learned how their particular jobs fitted into the larger picture; they learned of competition from plastics, slate tile, rubber-coated materials and woods, as well as from other metals and alloys like copper, aluminum, stainless steel and bronze.

The Point — Letters and a tape recorded message from management stressed the importance of each man doing his share. A booklet on the Huntington Works provided a simplified explanation of how nickel and its alloys are produced. The point was driven home to employees and community leaders alike: Their future welfare depends to a great extent, on how well they do their jobs. Their future is tied to Inco's (and nickel's) future.

Federal Flood Insurance?

Rep. Frank Thompson Jr. (Dem., N. Y.) has submitted a bill to the House to establish a Federal Flood Insurance Administration. Coverage would be up to $10,000 on family residences, $100,000 on other real and personal property.

Private insurance companies would be assisted by federal reinsurance to provide coverage for loss in excess of the federal program.

The U. S. Chamber of Commerce has told Congress that government aid to flood victims should be recognized as relief, because flood risks are not insurable. Even if insurance were possible, a chamber spokesman said, uninsured property owners likely would be offered government aid in the same amount as those who had bought insurance.

Kitchen Cabinet Promotion

In 1956, manufacturers of steel kitchen cabinets hope to match 1955's sales of $210 million, which were 20 per cent ahead of 1954's. A remodeling drive (September is steel kitchen cabinet month) will be used to balance sales lost because of fewer new home starts.

Thirty firms consume about 250,000 tons of steel annually in kitchen cabinet production, with 21 companies doing 90 per cent of the volume.

Loans Help Satisfy Appetite

Two loans to South American steel companies have been awarded by the Export-Import Bank to help satisfy the growing appetite for steel there. Brazilian National Steel Co. gets $35 million to expand production from 700,000 to 1 million ingot tons annually at its integrated Volta Redonda mill.

Chile's Cia. de Acero del Pacifico, S. A., will get $3.35 million toward an $8.5-million reversing hot strip mill. This company (annual ingot capacity is 360,000 tons) reports a nine-month backlog of orders.

British Information Service

With demand pressuring British blast furnaces . . .

U.K. Plans Steel Expansion

BETWEEN now and the end of 1958, British steel production will be increased by more than 3 million ingot tons. Today's capacity is 25 million tons. Expansion will include substantial new capacity for sheet and plate.

During 1955, drawing-quality sheet was one of the stand-out shortages on the British steel scene. Today, with the auto industry cutting back, other customers are taking over to keep mills hard-pressed.

Expansion—John Summers Ltd., one of Britain's biggest sheet producers, will spend $46 million to increase its capacity for crude steel and for sheet and plate by about 500,000 tons each.

A rapid increase in the use of oil for domestic heating is behind a new rush for oil drums. In 1955, British firms received orders for oil equipment and materials of close to $350 million, up 53 per cent from 1954 and well above the previous high of $255 million, set in 1952.

Exports—Bicycle and motorcycle manufacturers upped their export sales in 1955 by about 10 per cent, to $112 million. Automakers turned out 1.2 million vehicles, 900,000 of them cars. On the export market, they brought in close to $600 million. Though car sales have dropped off this January, manufacturers say the downturn is largely seasonal.

Metalworking Moves In

American metalworking interest in overseas markets continues to pick up. Here are some recent expansions:

Ferro Corp., Cleveland, manufacturer of heat-treating furnaces and equipment for the porcelain enameling industry, announces a new direct sales office in Hong Kong, China.

Dresser Industries Inc., Dallas, expands gas turbine and oil well equipment activities in Britain.

Whiting Corp., Harvey, Ill., materials handling equipment maker, forms new export division with New York headquarters.

Clark Equipment International is formed to consolidate export activities of all Clark Equipment subsidiaries. American branch offices: Battle Creek and Benton Harbor, Mich.

Warner Electric Brake & Clutch Co., Beloit, Wis., licenses two German firms to make its clutches and brakes. Warner also maintains plants in Switzerland and Britain.

When in Rome

American business operating overseas should be governed primarily by the laws and customs of the land in which it is maintained, rather than by American law. That's the opinion of American Chamber of Commerce in London, Inc., 7 York Building, Adelphi, W. C. 2, London, focal point for American companies operating in Britain.

It's bearing down hard on application of Sherman act principles to metalworking activities overseas. In 1954, it estimates, value of goods and services produced in Britain by American affiliates ran over $2 billion. It fears further expansion may be limited, that some of this investment could be destroyed and that British companies may be forced to tie up with Europe rather than the U. S. unless Congress amends the laws. Copies of its argument are available from D. L. Gill, secretary, at the London address.

Ours is a rich heritage

The name "BULLARD" on machine tools dates back three-quarters of a century — to 1880. Bullard tradition stands for advanced design in engineering, quality of craftsmanship and reliable performance. Consistent with today's production requirements and with foresight to the future needs of industry, Bullard Machine Tools have been designed, engineered and built to produce for your highest efficiency.

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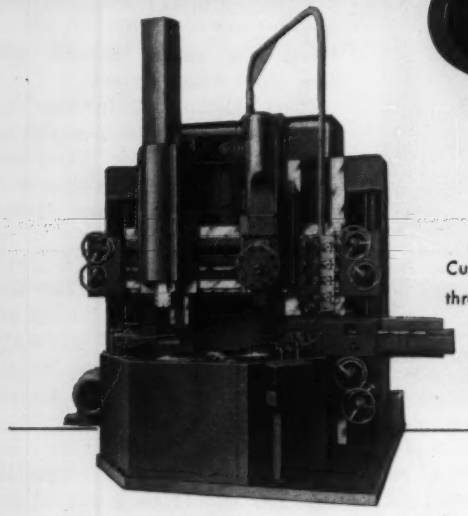
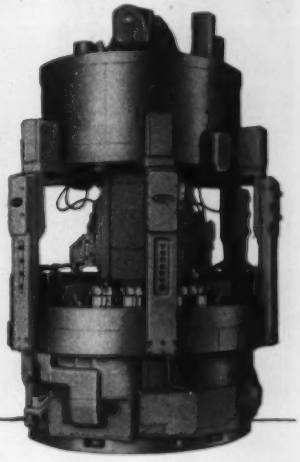
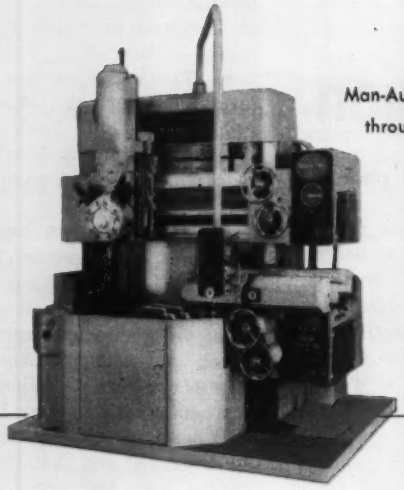


Mult-Au-Matic, Type "L" 10" with 6, 8, 12 or 16 spindles, 14" and 18" with 6 or 8 spindles

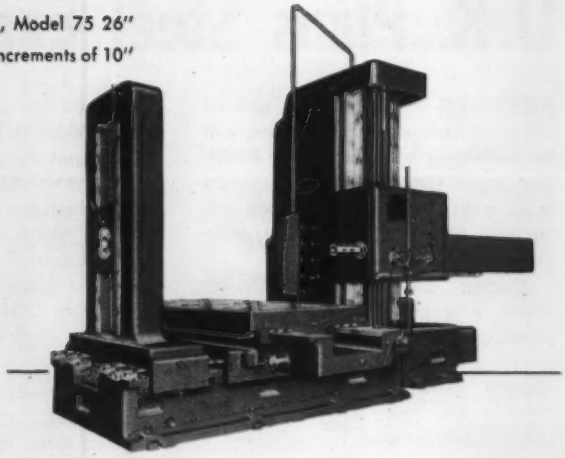
Cut Master V.T.L., Model 75 26" through 76" in increments of 10"



Horizontal Boring, Milling and Drilling Machines, Model 75 3", 4" and 5" Spindle Size, Table Type



Man-Au-Trol V.T.L., Model 75 26" through 76" in increments of 10"



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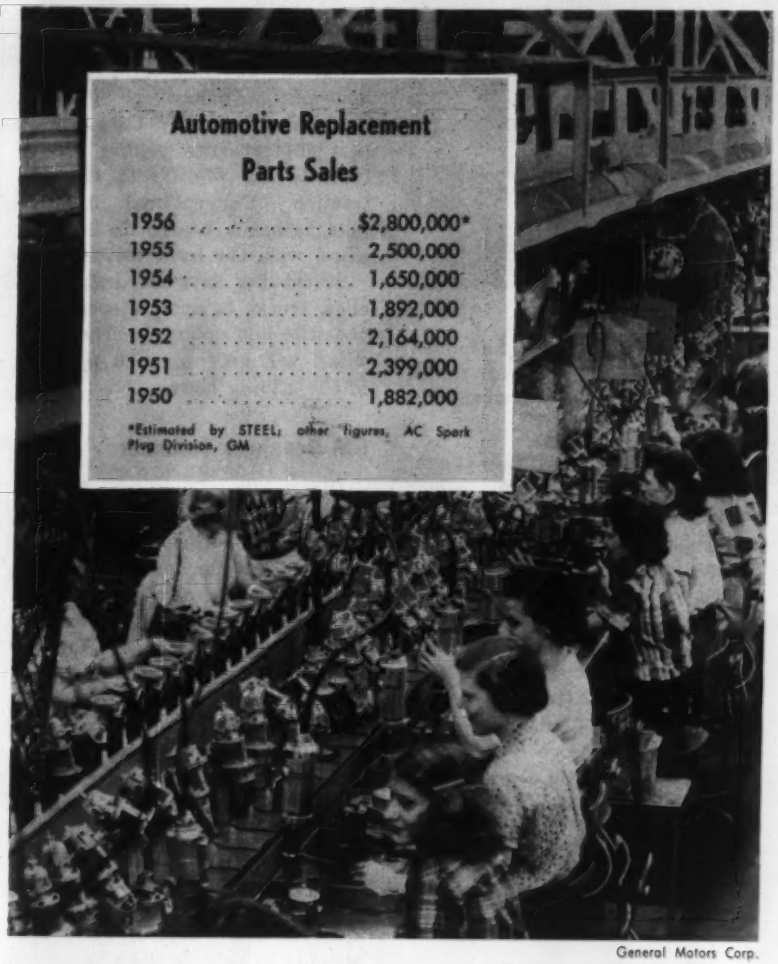

General Motors Corp.

Strong replacement market boosts prospects as . . .

Parts Business Stabilizes

CUTBACKS that have been hitting automotive parts suppliers show signs of leveling off.

The feeling is that demand will stabilize by the end of the second quarter. Barring a major slump in auto production, partsmakers should have smooth sailing the second half.

Slight Slump — Sales won't be so strong as they were in 1955. Last year's volume was reported to be $3 billion by Sherrod E. Skinner, General Motors' vice president in charge of accessory divisions. Most parts people expect a cut of 8 to 10 per cent on original equipment sales. This slump will pretty much parallel the predicted drop in 1956 car production.

Replacement parts sales will increase, probably about 12 per cent (see table above). Joseph A. Anderson, general manager of the AC Spark Plug Division of GM, says that 1955 replacement sales for AC were 27 per cent over 1954's. He predicts further gains for '56, even though military demand will be dropping lower.

In either case, the over-all sales volume will give parts makers one of their best years.

Wide Range — Demand varies with the product. Cuts range from 5 to 8 per cent for such items as tierods, bearings and ventilator screens; up to 25-35 per cent on coil springs, fasteners, window channels and some trim ornaments. Malleable castings, crankshafts, oil filters, wheels and major body stampings are down from 10 to 15 per cent.

Automakers' stock control programs partly explain these variations. Smaller items which can be used on '57 and even '58 models haven't suffered as much as hard-to-store parts and those which will be changed when the '57 cars come out.

Then, too, most parts manufacturers have blanket orders, with floating release dates. Much of their output may come in the first part of the year as automakers stock up for the season's push. Some of the companies showing heaviest cutbacks now expect to recover in the second quarter.

First Hit—Smaller manufacturers are harder hit than big ones. This is partly because smaller companies fill the extra demand for parts and are the first to go in any cutback program. Many of the larger manufacturers scheduled their cuts right along with the predicted drop in auto production.

Causes—Behind these cutbacks lie the same basic reasons that are causing the drop in auto output: Extremely high output and sales last year. Dealers now have inventory pileups. Also: The first quarter traditionally is a slow period for automakers. This year is no exception.

According to *Ward's Reports*, automobile production in January totals 611,190, compared with 659,719 in 1955. Last year, February production was 675,769 units. This year, *Ward's* estimates February output at 611,000. But with more layoffs coming up, 575,000 to 600,000 is a more likely guess.

Steel—As a result of steel cutbacks by the auto companies, some parts suppliers say that steel is easier to get. They cite mill delivery dates of 30 to 60 days and

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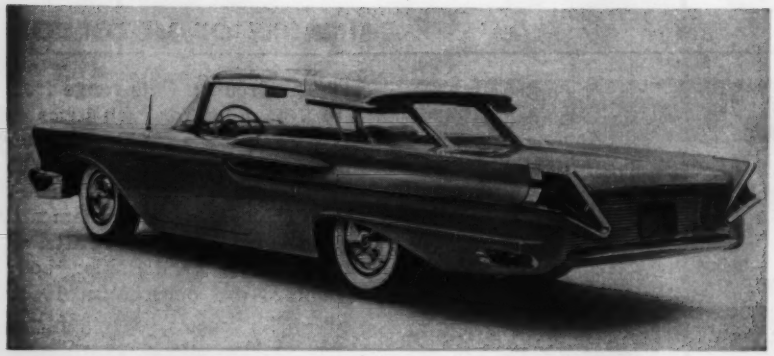


Mercury's XM-Turnpike Cruiser

Lines of this experimental car preview the styling of 1957 models. Sculptured side channels give a Y-shaped appearance to the rear end. The car stands 4.4-ft high, 18.4-ft long and is 77.1-in. wide. It's to be shown nation-wide

less. But sheet and strip users say they still can't get mill deliveries in less than three months—in some cases, double that. Stainless steel users also claim the going isn't much easier.

One purchasing agent for a stamping firm puts it this way: "Sure the auto companies are cutting back on mill orders, but only on out-of-town orders. The local situation is still plenty tight!"

Summary—Parts people will be sharing the fortunes of the auto industry. Most of them feel their sales in 1956 will parallel automobile sales—they may even do a bit better.

Chrysler Forms New Group

Chrysler Corp., Detroit, has set up an engine and transmission manufacturing group.

It has been formed primarily to combine machined forging and casting operations so that all car divisions can get better delivery.

L. L. Colbert, president, says that the group takes in the Forge & Foundry Division, Axle & Transmission Division and Engine Division. Ten plants are involved, five in the Detroit area and five in Indiana.

The Forge & Foundry Division is made up of the Dodge forge plant, Detroit, (crankshafts); Winfield Foundry, Detroit, (camshafts), and the New Castle, Ind., forge plant, which makes transmission parts, steering gear and front suspension components.

The Engine Division initially will operate at the Mound Road engine plant in Detroit. No future expansion is expected there, and rumor has it that Chrysler will build a larger engine plant elsewhere. At present, the Mound Road plant makes Plymouth V-8 engines.

In the Axle & Transmission Division are the Indianapolis automatic transmission plant; Kokomo (Ind.) plants No. 1 and 2 (transmissions); the New Castle (Ind.) machining plant (shock absorbers); Lynch Road (Detroit) plant for rear axle assemblies; and the Detroit Universal Driveshaft & Universal Joint Division.

U. S. Auto Output

Passenger Only

	1956	1955
January	611,190†	659,719
February		675,769
March		794,188
April		754,007
May		724,891
June		649,372
July		659,979
August		614,392
September		461,592
October		517,669
November		748,559
December		†682,698
Total		†7,942,983

Week Ended	1956	1955
Jan. 14	149,995	155,109
Jan. 21	144,729	161,150
Jan. 28	135,586	160,666
Feb. 4	140,582	164,265
Feb. 11	139,592†	168,059
Feb. 18	138,000*	173,482

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Nonslip Differential

A nonslip truck differential will be available on Studebaker half-ton trucks after Mar. 1.

Harold E. Churchill, general manager, Studebaker division, Studebaker-Packard Corp., says that it transmits engine driving force to the wheel with the best traction. Conventional differentials transmit power to the rear wheel with the least traction.

Studebaker says its design will allow trucks to operate even when one wheel is spinning. The other wheel will get up to 80 per cent of the driving power.

GM Develops Balancer

Oldsmobile Division, General Motors Corp., has an air suspension balancer which automatically register the amount and location of wheel and tire unbalance.

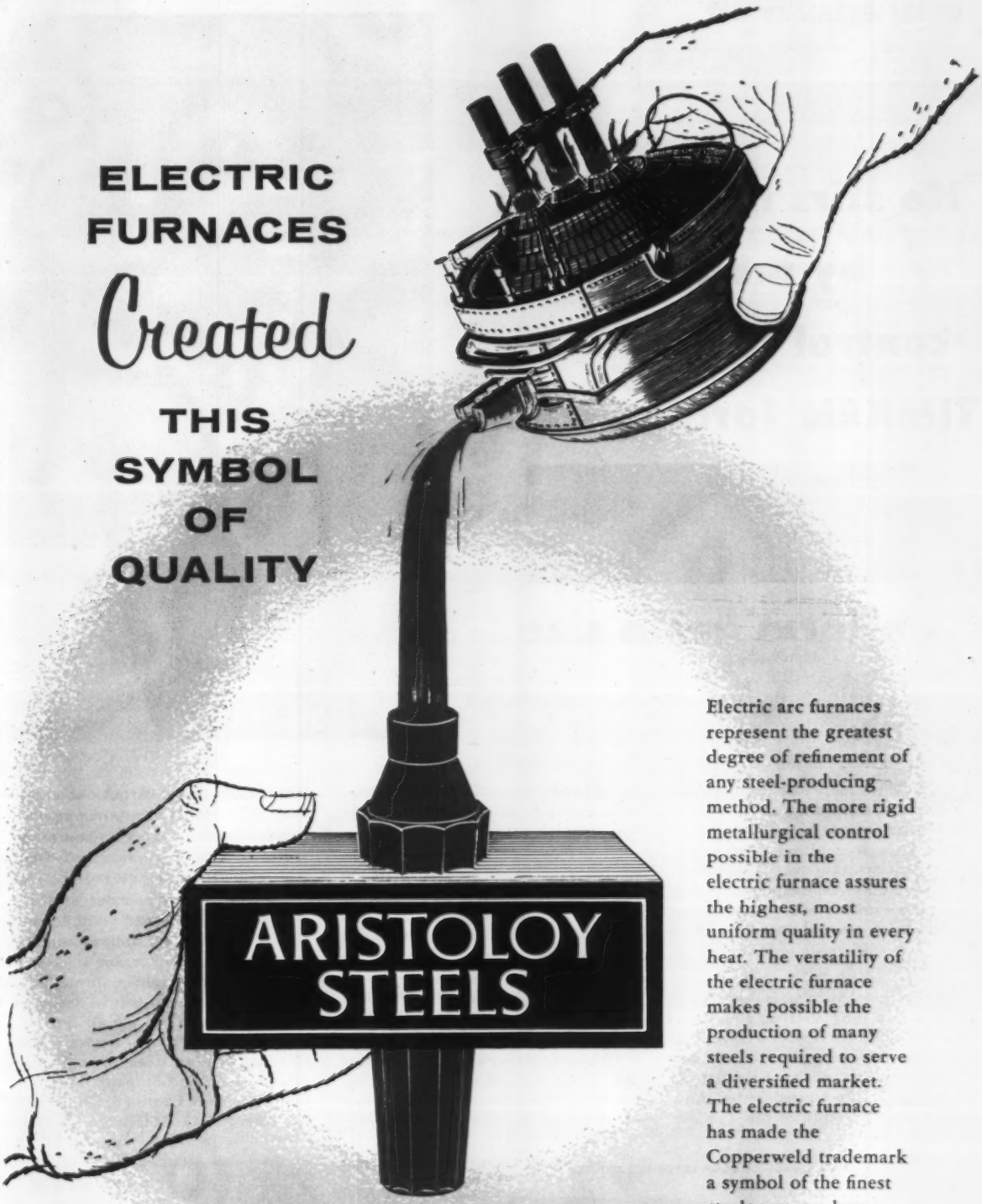
It works like this: Wheels with tires already inflated are lowered onto air-ball pivots; air pressure (60 lb) is supplied through the pivot stems, so each wheel and tire is balanced on a cushion of air 0.002-in. thick.

The wheel and tire tilts toward its unbalanced (heavy) side. An automatic marker stamps the amount of unbalance in ounces on the wheel rim, opposite the heavy side. An operator clamps on proper weights to balance the wheel.

Exhaust Notes

Ford Motor Co., Detroit, plans to build a steering gear and small parts plant just east of Indianapolis. It will produce bumpers at its Monroe, Mich., plant starting in the summer of 1957. . . Finished steel shipments to the auto industry totaled 18.7 million tons (23.1 per cent of steel output) in 1955 . . . Chrysler Corp., Detroit, reports 1955 annual sales of $3.4 billion, 67.3 per cent over 1954's. Net earnings: $100 million, versus $18.5 million the year before . . . American Motors Corp., Detroit, says the current auto slump hasn't hurt it. Rambler sales in January climbed 52.7 per cent over the preceding month; 24.3 per cent over January, 1954. The company is boosting February production 61 per cent over February last year.

ELECTRIC FURNACES *Created* THIS SYMBOL OF QUALITY



Electric arc furnaces represent the greatest degree of refinement of any steel-producing method. The more rigid metallurgical control possible in the electric furnace assures the highest, most uniform quality in every heat. The versatility of the electric furnace makes possible the production of many steels required to serve a diversified market. The electric furnace has made the Copperweld trademark a symbol of the finest steels you can buy.

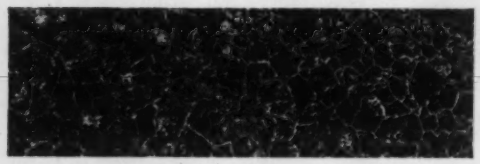
STANDARD STRUCTURAL ALLOY • BEARING QUALITY • ALLOY TOOL • NITRALLOY • CARBON TOOL • SPECIALTY • MAGNAFLUX-AIRCRAFT QUALITY

Hot Rolled • Forged • Annealed • Heat Treated • Normalized
Straightened • Cold Drawn • Machine Turned • Centerless Ground

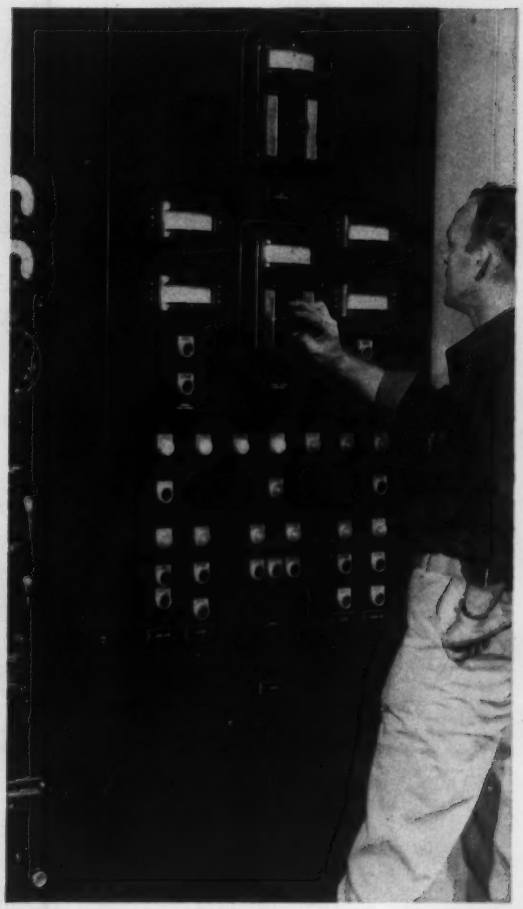
COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.

He stirs molten steel by magnetic control to help give TIMKEN® forging steels



uniform grain size



WITH the mere turn of a dial, the man pictured here stirs molten steel in one of our huge electric furnaces. He's controlling a magnetic stirrer that assures equal distribution of alloys, uniform temperature and improved working of the slag . . . one of the quality control operations that helps give uniformity to every bar of Timken® forging steel.

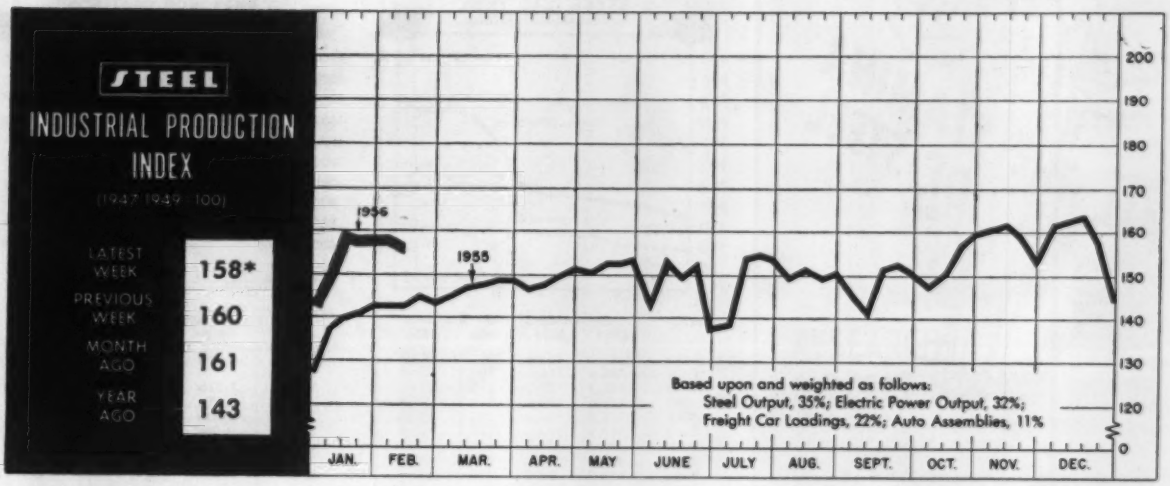
Conventional stirring is done manually with a long stirring rod. This new method does it with a travelling magnetic field set up by coils under the furnace. It's the first installation of its type in the United States. And it's another example of the Timken Company's continual search for equipment that will improve steel quality and keep it uniform.

For instance, note the uniform grain size of Timken forging steel in the photomicrograph above. We use the most modern steel-making techniques known to get this uniformity in our steel. And we examine every heat to be sure it's there. Result: you can be sure that your forgings made from this steel have uniformly high ductility and resistance to impact.

To further assure uniformity in your forgings, fewer changes in your forging procedures, your order of Timken forging steel is handled *individually*. This allows us to target our conditioning procedures to your end use requirements. In every lot you order, you get the same physical and chemical properties that you require—bar to bar, heat to heat, order to order. And helping to lower your production costs, the close dimensional tolerances of Timken forging steels produce uniform weight multiples with a minimum of steel lost in flashings, saving you steel. To get all these results in your forgings, always specify Timken forging steels. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Feb. 11

Construction Heads for New Records

CONSTRUCTION set a pace in January, which if maintained, could go a long way toward keeping the national economy on an uptrend, or at the least, on an even keel.

The brightness of the picture depends on which of the three or four major surveys of the industry you read. All agree that January is ahead of the corresponding month last year. F. W. Dodge Corp. says the gain was 25 per cent. *Engineering News-Record* puts this year ahead by 23 per cent. The joint report of the Labor and Commerce departments says the gain is only 1 per cent.

Compare the Base—Estimates vary because of different methods of collecting data, the geographical areas covered and the types of activity reported. Dodge covers contract awards for future construction in 37 eastern states, indicating a sort of backlog in construction. *ENR* also measures the value of incoming contracts, but it sticks with heavy engineering construction. The government's report measures new construction activity, including homebuilding. This report says private construction declined 12 per cent in January, reflecting the slightly more than seasonal drop in residential building. But industrial building continued its upward swing, establishing a new monthly record at $228 million.

Another important factor to consider is the seasonal influence on construction. All three sources agree that January is below the actual values for December in most categories. This is normal because of the weather. The real test will come in February and March, when the construction curve historically begins its upturn. *ENR* says February is starting off in fine style. Heavy construction awards for the week ended Feb. 9 totaled $539.9 million, bringing the 1956 total to $2,665,717,000, compared with $1,874,104,000 for the comparable period last year. That's an in-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,408[1]	2,439	2,150
Electric Power Distributed (million kw-hr)	11,520[1]	11,540	9,922
Bitum. Coal Output (1000 tons)	9,825	10,350	8,700
Petroleum Production (daily avg—1000 bbl)	7,000[1]	7,081	6,719
Construction Volume (*ENR*—millions)	$539.9	$533.0	$298.9
Auto, Truck Output, U. S., Canada (*Ward's*)	168,837	174,469	191,136
TRADE			
Freight Car Loadings (1000 cars)	686[1]	681	644
Business Failures (Dun & Bradstreet)	265[1]	273	238
Currency in Circulation (millions)[3]	$30,219	$30,223	$29,779
Dept. Store Sales (changes from year ago)[3]	+5%	+8%	0%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,621	$21,065	$19,846
Federal Gross Debt (billions)	$279.7	$280.1	$278.4
Bond Volume, NYSE (millions)	$19.2	$24.9	$23.5
Stocks Sales, NYSE (thousands of shares)	10,311	9,775	17,108
Loans and Investments (billions)[4]	$84.7	$85.2	$85.4
U. S. Govt. Obligations Held (billions)[4]	$28.8	$29.5	$35.8
PRICES			
STEEL's Finished Steel Price Index[5]	209.10	209.10	194.53
STEEL's Nonferrous Metal Price Index[6]	267.9	267.8	228.6
All Commodities[7]	111.7	112.0	110.3
Commodities Other than Farm & Foods[7]	119.9	119.8	115.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

FOR IMPORTANT NEW SAVINGS IN GRIT BLASTING

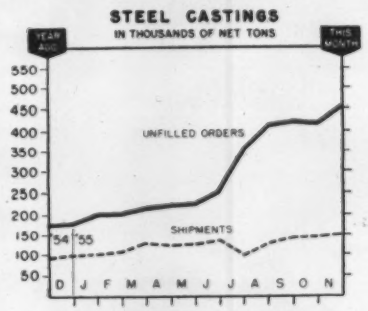
STEELETTS PRODUCE SUPER-ETCH FINISHES AT A NEW LOW COST

Steeletts, the new steel grit, are proving long life and low cost with results like these: Grit needs slashed 75%, maintenance down 40%, blast time cut 54%. Steeletts are guaranteed to save you money. For more details, write for Bulletin 901-D.

WHEELABRATOR CORPORATION

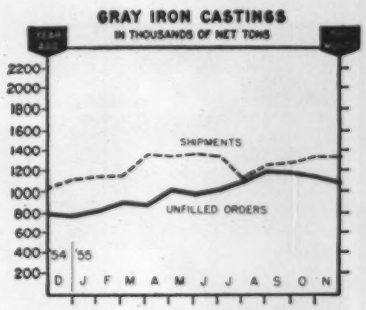
509 South Byrkit Street
Mishawaka, Indiana

THE BUSINESS TREND



	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	98.2	122.8	201.8	251.8
Feb.	106.4	116.5	202.3	234.6
Mar.	127.5	122.3	215.1	214.3
Apr.	120.1	105.8	221.3	197.9
May	122.5	94.6	225.3	182.5
June	133.9	100.0	251.4	169.6
July	97.8	75.8	354.6	170.6
Aug.	126.4	89.6	413.5	168.3
Sept.	140.8	88.4	420.6	158.8
Oct.	145.7	87.1	418.1	154.1
Nov.	152.4	87.7	453.1	175.7
Dec.	....	93.5	....	179.1
Total	....	1,184.1		

*For sale. U. S. Bureau of the Census



	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	1,092	932	783	872
Feb.	1,106	936	852	865
Mar.	1,315	1,047	842	842
Apr.	1,294	995	966	826
May	1,310	943	938	775
June	1,296	987	982	804
July	1,070	821	1,050	829
Aug.	1,226	935	1,160	830
Sept.	1,253	921	1,151	811
Oct.	1,310	942	1,113	789
Nov.	1,308	997	1,062	760
Dec.	....	1,074	....	745
Total	....	11,530		

*For Sale. U. S. Bureau of the Census

Charts copyright, 1956, STEEL.

crease of 42 per cent. *ENR's* weekly figures are subject to wide fluctuations because a single large contract shows up clearer than in a monthly report. But it is significant that of the six weeks so far in 1956, only one—the abbreviated New Year's week—has shown any weakness.

Bright Outlook—The Associated General Contractors of America Inc. predicts that new construction this year will reach $44.5 billion and repair activities will climb to $15.5 billion. Highway building prospects will be brightest, but heavy construction and building will share in the increase.

In a continuing effort to curb the dip in home building, a House banking subcommittee, headed by Rep. Albert Rains (Dem., Ala.), urges two courses of action: 1. The government revoke its order boosting down payments on home loans guaranteed by FHA and VA. 2. Immediate relaxation of mortgage credit curbs. Federal Housing Administration says that mortgage money is beginning to loosen up.

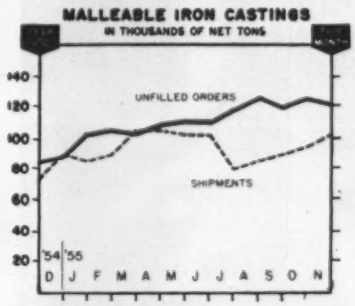
Electric Output Hits Peak

Another strong plus in the economy is electric energy. The Federal Power Commission says production of electric energy by the nation's utilities last year reached a record of 545.4 billion kw-hr, up 15.8 per cent from the record set in 1954. December marked the first time the industry passed 50 billion kw-hr in a single month. The December total of 50.7 billion kw-hr exceeded the previous record (August, 1955) by 2.8 per cent. January seems certain to break the record on the basis of weekly figures from Edison Electric Institute.

The electric power industry has been instrumental in keeping STEEL's industrial production index near the 160 mark (1947-1949 =100). The week ended Feb. 11 settled to a preliminary 158, following three weeks in a row at 160.

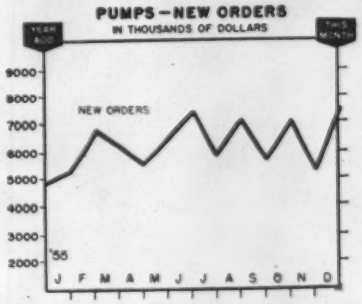
Employment at January High

The latest Department of Commerce employment figures indicate that 1956 started out at record levels. Civilian employment totaled 62.9 million, a record for that month and about 2.7 per cent higher than January, 1955. Although the total was down 1.3 million from December, the decline was seasonal, resulting mostly from



	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	82.0	70.3	99.8	85.6
Feb.	86.0	69.1	101.8	81.6
Mar.	102.4	84.3	99.7	74.2
Apr.	101.2	74.5	104.1	69.1
May	98.4	67.9	106.4	67.0
June	99.5	72.8	107.6	60.2
July	75.6	50.9	115.4	63.7
Aug.	82.4	59.3	123.4	62.5
Sept.	87.2	58.0	116.6	66.7
Oct.	90.9	64.3	121.3	71.1
Nov.	99.3	70.0	117.0	80.7
Dec.	....	....	....	85.1
Total	....	....	829.3	

*For sale. U. S. Bureau of the Census



	1955	1954	1953
Jan.	5,220	4,057	5,752
Feb.	6,709	4,272	6,521
Mar.	6,161	5,093	8,255
Apr.	5,447	5,319	7,758
May	6,411	5,007	4,629
June	7,419	5,176	5,690
July	5,834	4,733	5,533
Aug.	7,022	6,706	4,886
Sept.	5,664	5,050	4,845
Oct.	7,048	3,828	5,097
Nov.	5,249	5,224	4,634
Dec.	7,624	4,787	4,645
Total	75,808	59,252	68,245

Hydraulic Institute

the lay off of temporary holiday workers. Unemployment rose by 450,000 to 2.9 million, normal for this time of the year. Factory employment provided the only significant decrease, dropping to 16.8 million. This reflected cutbacks in the automotive industry and repercussions in the fabricated metal shops.

Personal income for December was at an annual rate of $315 billion. This was $3 billion higher than in November and about $22 billion higher than in December, 1954, says Commerce's Office of Business Economics. For the year as a whole, personal income came to $303.5 billion, 5.5 per cent higher than in 1954. The main factor: Higher average earnings per employee. Both employment and earnings are bound to show up on the minus side when January figures are out because of cutbacks in the automotive and related industries.

Auto Sales, Output Slide

The automotive dip is continuing into late February as the industry struggles with unwieldy new car stocks. Estimated at above the 830,000-unit level by *Ward's Automotive Reports*, stocks may go even higher as the result of slow sales in late January. Purchases slipped 12 per cent under the December level, despite some of the most unusual and expensive sales gimmicks seen in recent years. February looks like a good bet for no more than 500,000 sales, compared with 560,000 during February, 1955. This can mean only one thing: Further production cutbacks. Packard Division of Studebaker-Packard Corp. was still shut down last week, and some Chrysler Corp. divisions were still toying with the idea of another four-day week. Of the 16 automakers reporting to *Ward's*, seven showed increased production for the week ended Feb. 11; eight showed lower production; and one stayed about even. Net result: 139,592 units, compared with 140,582 the week before. Truckmakers kept the light burning by turning out 24,979 units, compared with only 14,774 during the comparable week a year ago.

Ward's says that used car dealers are supplying much of the optimism still underlying the softening automobile market. They reported January sales above both December and November as well as January of last year. Inventories are less than 30 days.

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and PURCHASING AGENTS
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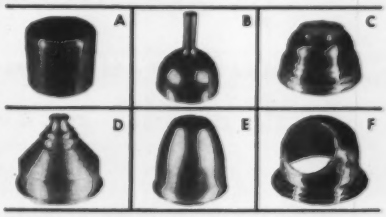
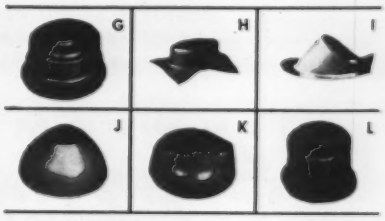
for all fabrications including metal spinning, spinforming, hydroforming, welding and finishing.



METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Handle lamp; C—Lamp shade; D—Lamp base; E—Electronic cover; F—Compass cover.



HYDROFORMING:
Typical items: G—Appliance cover; H—Jet engine detail; I—Aircraft detail; J—Jet engine detail; K—Cleaner cover; L—Motor housing.

ROLAND TEINER Company, Inc.

DEPT. 25 - 134 TREMONT STREET, EVERETT 49, MASS.
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ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

MONEY-SAVING MAGIC IN THIS "HEEL AND TOE"

This Tinnerman fastener is modeled after your foot . . . there's a heel and toe . . . it slides easily into the holes punched in the metal, fiber, or plastic, even as your foot slides into a shoe. But it is much easier to put on than to take off!

The primary function of this SPEED NUT fastening principle is to provide a fast, easy-to-apply, low-cost, self-retaining fastener. Its snap-on attachment feature requires little skill and no welding or staking. Yet it assures positive retention for center panel or blind locations.

Tinnerman "heel-and-toe" fasteners can also have a wide variety of fastening features. The self-retaining heel-and-toe can be combined with the famous Tinnerman SPEED NUT impression. Or with a speedy cable clip . . . or a spring catch . . . a molding clip . . . a wire retainer . . . almost any fastening idea you require.

Tinnerman sales engineers are ready to make a SPEED NUT Analysis of your fastening requirements. Or you can write to us for details and engineering data. *Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.*

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Speed Nuts®
FASTEST THING IN FASTENINGS®

On dictating equipment, this SPEED CLIP® holds wires safely away from moving parts.

SPEED CLIPS secure molding on plastic sign, help manufacturer gain 48% assembly saving.

Assembly of TV tuning coil to chassis and servicing simplified with special SPEED CLIP.

A. BAIRD HARRIS
. . . director of purchases at Anaconda

ROBERT C. WAYNE
. . . Hamilton Foundry sales mgr.

H. F. DEVENS
. . . Mississippi Aluminum mgr.

A. Baird Harris was appointed director of purchases of **Anaconda Co.**, New York. He has been purchasing agent since January, 1948.

Herman Nelson Division, American Air Filter Co. Inc., appointed **William H. Treffinger** manager of its Morrison, Ill., plant to succeed **Robert Bryan,** resigned. Mr. Treffinger was plant superintendent, Wayne Works Inc.

Richard A. Probert was named operations manager of **Drake Steel Supply Co.**, San Diego, Calif.

Wallace G. Smith Jr. was named sales manager for **Globe Hoist Co.'s** industrial lift division, Philadelphia.

Lewis Bolt & Nut Co., Minneapolis, appointed **Lawrence Nipp** manager of its galvanizing division. He was plant superintendent of Hanlon-Gregory Galvanizing Co.

Crucible Steel Co. of America appointed **Charles W. Yutmeyer** superintendent in charge of the open hearth and electric furnace melting departments at the Midland, Pa., Works.

Henry A. Jewell, director of purchases for Borg-Warner Corp.'s **Detroit Gear Division** since 1951, assumes additional duties as director of purchases for the **Long Mfg. Division,** also at Detroit.

Robert C. Wayne was made sales manager, **Hamilton Foundry & Machine Co.**, Hamilton, O. He was advertising and sales promotion manager of the industrial divisions of Surface Combustion Corp.

David D. Gordon was made sales manager, **Fulton Sylphon Division,** Robertshaw-Fulton Controls Co., for the Los Angeles district. **W. J. Hajek,** manager of the Los Angeles office, transferred to the Chicago office.

Lloyd B. Cogswell Mfg. Co., Springfield, Mass., appointed **James R. Sisson** general manager and sales engineer of its new Atlas Industrial Roll Division.

Albert C. Wedge was named production superintendent for **DeWalt Inc.**, Lancaster, Pa., subsidiary of American Machine & Foundry Co.

Loren B. Clay was made manager-tubular products and cold finished bar sales at **Joseph T. Ryerson & Son Inc.**, Los Angeles. He replaces **John R. Fennie,** now manager of the southwest Los Angeles sales district.

Fred S. Hudson was named general manager-sales, heating and air conditioning division, **National-U.S. Radiator Corp.**, Johnstown, Pa. He was in charge of marketing in the Pittsburgh, Cincinnati and Cleveland branch sales offices.

H. F. Devens was appointed manager of **Mississippi Aluminum Corp.**, Gulfport, Miss., subsidiary of Olin Mathieson Chemical Corp. He has been with Olin Mathieson's metals division in East Alton, Ill., as sales manager, Olin Roll Bond products. **U. R. Jaeger** succeeds Mr. Devens as acting sales manager.

Standard Pressed Steel Co. made **John W. Breitmayer** sales manager of its **Hallowell Collar Division,** Jenkintown, Pa., to succeed **Alfred H. Klepfer,** retired.

Sanford L. Swain was elected vice president-manufacturing at **Wisconsin Steel Corp.**, San Diego, Calif.

Ernest L. Hicks was elected a vice president of **American Floor Surfacing Machine Co.**, Toledo, O.

Edwin A. Booth joined **Jones & Laughlin Steel Corp.**, Pittsburgh, as manager-tubular products division, succeeding **C. T. Hapgood.** He was manager-tubular sales at National Supply Co. **Wilbert F. Huntley** was made director of blast furnace operations on the staff of vice president-production. He is replaced by **Alfred T. Sadler Jr.** as superintendent, blast furnace department, Aliquippa, Pa., Works. **Walter C. Grantham** was made superintendent of the Kansas City container division plant to succeed **William T. Buchanan,** now assist-

REX D. CROSS
. . . Laclede-Christy v. p.-sales

SAMUEL G. WAGNER
. . . Kaiser's industry sales mgr.

ROBERT L. COLLINS
. . . Ford special products div. post

ant manager of operations, container division, New York.

Rex D. Cross fills the new post of vice president - sales, **Laclede-Christy Division**, H. K. Porter Company Inc., at St. Louis. He was a management consultant in Los Angeles. Earlier he was general sales manager, Johnston Pump Co., now a part of Youngstown Sheet & Tube Co.

Charles W. Springer fills the new post of director-research and development for **Graver Tank & Mfg. Co.**, Chicago. He transfers from New York where he served as vice president and head of eastern sales.

Gaylord B. Barnes was appointed staff assistant to the president of **American Steel & Wire Division**, U. S. Steel Corp., Cleveland. He replaces **Richard Kimmel**, now administrative assistant to the vice president-general manager of the division's cyclone fence department, Waukegan, Ill.

Louis Zinader was made New York district manager, **Luria Bros. & Co. Inc.**

James Fentress was named general sales manager of **Foote Mineral Co.**, Philadelphia. He was director of economics planning and also served as manager of petroleum sales.

H. E. Markley was made assistant to the president of **Timken Roller Bearing Co.**, Canton, O. **George L. Deal** was made secretary-treasurer.

Samuel G. Wagner was named manager of industry sales, a newly organized department of **Kaiser Aluminum & Chemical Sales Inc.**, at Chicago. He was special assistant to John Menz, general sales manager.

Newport Steel Corp., Newport, Ky., appointed **Rudolph R. Kuhni** combustion engineer.

Joseph L. DeBarbieri was made production manager, **Luria Engineering Co.**, Bethlehem, Pa.

Raymond G. Nordstrom, general manager, was elected vice president-general manager of **Reflectal Corp.**, Chicago, a subsidiary of Borg-Warner Corp.

Ronald Lehr was elected president and chief executive officer of **Baker Bros. Inc.**, Toledo, O. He was president and sales manager of Quincy Compressor Co.

Harris Calorific Co., Cleveland, made **Ralph A. Trout** sales manager and **Roy L. Rasmussen** assistant to the sales manager.

Richard Herold was made general sales manager, **Harrisburg Steel Corp.**, Harrisburg, Pa. He continues as vice president-foundry sales for the Taylor-Wharton Division, High Bridge, N. J. Headquarters are at Harrisburg.

Russell C. Kinsman was named superintendent of works engineering for **Bullard Co.**, Bridgeport, Conn.

Robert L. Collins was appointed manufacturing manager, special products division, **Ford Motor Co.**, Dearborn, Mich. He was supervisor of manufacturing engineering services section for Ford Division.

Walter A. Cox was appointed general manager of **WW Alloys Inc.**, Detroit, division of Fansteel Metallurgical Corp. **Henry D. Weed** and **Richard I. Allen**, formerly general manager and sales manager, respectively, are establishing a business as manufacturers' representative to sell and service WW Alloys' products.

Chrysler Corp., Detroit, appointed **R. S. Bright** group executive in charge of its engine and transmission group. The new manufacturing group is composed of the forge and foundry division with **Alfred L. Gostow** as general manager; the engine division, with **Raymond A. McCarroll** as general manager; and the axle and transmission division which Dr. Bright, for the present, will serve as general manager.

Jerome Mfg. Co., San Diego, Calif., named **D. J. McCoy** plant manager and **R. O. Jefferson Jr.** production manager.

James D. Norman was made sales manager and **Warren R. Black** chief engineer of the new Fastex division of **Illinois Tool Works**, Des Plaines, Ill.

Elmer O. Witt joined **Diamond Steel Corp.**, Chicago, as assistant

Continental Quality Standards Met by P-D Paint Finishing Systems

Throughout the entire automotive industry (as in many other fields) quality standards are paramount. In such a competitive field, the finish of products must receive public acceptance. Plant engineers of the Continental Division—Ford Motor Company established extremely exacting standards when planning the set-up and equipment of their new plant. As every one now knows, the Continental Mark II is not a mass-produced automobile. Its manufacture is done under rigid quality controls. In this new plant the limited production of this splendid automobile is handled on a one floor layout where space allotments for finishing operations were most carefully planned. The finishing systems installed here by PETERS-DALTON provide continuous operations through bonderite dry-off ovens, bake ovens, wet sand dry-off ovens, and spray booths with superb air make-up installations. Of course, the P-D Hydro-Whirl Method of cleaning and replacing air is a most important adjunct to smooth and flawless operations.

In whatever your field of manufacture, if you have finishing problems or needs, call upon P-D engineering knowledge. Whether your requirements are for a single spray booth or a complete finishing system, remember—we are exclusively contract manufacturers and can efficiently design, engineer, fabricate, and install the equipment to meet them and—within your space limitations.

We'll be glad to tell you more. Just write, wire or phone.
Representatives in principal cities.

1. All operations on one level, as pictured, include spray booths and air make-up.

2. Sides of booths with wet sand dry-off oven and bonderite dry-off oven.

P-D Hydro-Whirl Paint Spray Booths
P-D Industrial Washing Equipment
P-D Drying and Baking Ovens
P-D Hydro-Whirl Dust Collecting Systems

P-D Peters-Dalton INC.

RALPH L. DUNLEVY
. . . McLouth Steel's Detroit plant mgr.

EARL HUDSON
. . . mgr. of Rockwell's Calif. plant

sales manager. He was with General Steel Warehouse Co.

Ralph L. Dunlevy was made plant manager at Detroit for **McLouth Steel Corp.** He is replaced as plant superintendent by **George Low.**

Albert C. Childs was elected vice president - sales, **National Steel Corp.**, Pittsburgh, to succeed **James A. Henry,** retired. Mr. Childs was vice president-sales of National's Detroit division, Great Lakes Steel Corp., and is succeeded in that position by **Ross Wilkins,** former assistant vice president-sales.

Eugene L. Colcord Jr. was made assistant sales manager, **Green River Steel Corp.**, Owensboro, Ky.

Kenneth W. Bequette was made sales manager for consumer products in the Great Lakes area for **Reynolds Metals Co.** He is at Detroit. **Allison G. Monroe,** at St. Louis, was made sales manager, residential and light commercial windows.

Earl Hudson was made general manager of **Rockwell Mfg. Co.'s** new meter and valve plant at Porterville, Calif. He was assistant general manager for the DuBois, Pa., gas meter plant. **George E. Rockwell** fills the new post of sales manager-specialty products, Delta Power Tool Division. He is replaced as eastern regional sales manager at New York by **Thomas C. Mortimer. Warren B. Sherman** was made southern regional manager, Atlanta.

Daniel B. McDyre replaces **Gustave F. Ebeling,** retired, as superintendent of **Dodge Steel Co.**, Philadelphia.

David M. Roney Jr. was made assistant sales manager for **Hanson-Van Winkle-Munning Co.**, Matawan, N. J.

Robert Mann was appointed sales engineer for **Mann Engineering Co.**, Pittsburgh, sales representative for Fuller Co. He replaces the late **Charles E. Ashcraft.** Mr. Mann was general manager, instrument division, Roller-Smith Corp. He previously served for 15 years with Fischer & Porter Co.

Pacific Airmotive Corp., Burbank, Calif., elected **John W. Myers** chairman and **B. Allison Gillies** vice chairman.

At **Algoma Steel Corp. Ltd.**, Sault Ste. Marie, Ont., Canada, **Louis H. Derrer,** general manager-steel works, was elected a vice president. **Reg Armstrong** was promoted to assistant general manager-steel works; **Douglas Joyce** to general superintendent. **W. P. Dowhaniuk** succeeds Mr. Joyce as superintendent-blast furnaces. **C. C. Benton,** who directs open-hearth operations, will also serve as assistant to the executive vice president.

Lloyd Van Buskirk Jr. was named Detroit district manager, **Electro Dynamic Division,** General Dynamics Corp.

Mannesmann-Meer Engineering & Construction Co. Inc., Easton, Pa., appointed **Joseph Gaus** as its hydraulic engineer.

At **Surface Combustion Corp.'s** Toledo, O., industrial division, **Henry M. Heyn,** a corporation vice president, was made general manager; **Carroll Cone,** recently named chief engineer, assumes responsibility for engineering activities; **Donald Beggs** was made manager-research and development; and **G. J. Langenderfer** was made sales manager, heat treat division.

A. P. Rider was made assistant district sales manager at Los Angeles for **Republic Steel Corp. David E. Weaver** was made assistant superintendent at the South Chicago steel plant.

Donald F. Dimock was named Pittsburgh district sales manager, **National Electric Products Corp.**

OBITUARIES . . .

W. M. Reed, 63, founder and chairman of the board of **American Air Filter Co. Inc.**, Louisville, died Feb. 2.

Theodore Johnson, 74, former president, **J. I. Case Co.**, Racine, Wis., died Feb. 4.

Edwin C. Bell, 72, sales representative for **Atlantic Steel Co.**, Atlanta, died Feb. 5.

Dr. George Oenslager, 82, former research chemist with **B. F. Goodrich Co.**, Akron, died Feb. 5.

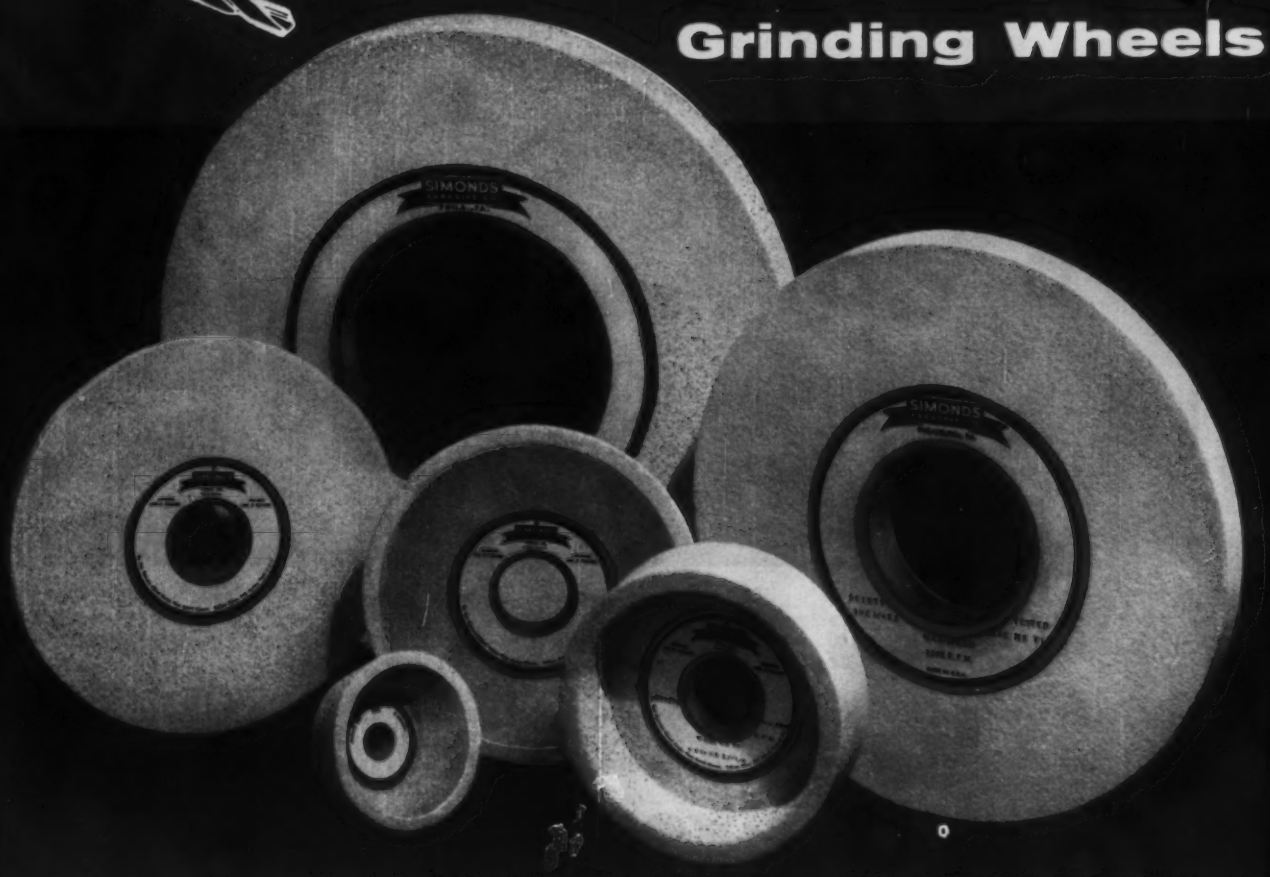
Dennis F. McCarthy, 67, former vice president-general manager, **A. O. Smith Corp. of Texas,** Houston, died Feb. 5.

Walter S. Lewis, 64, president of **Bellefontaine Plating & Mfg. Co.**, Bellefontaine, O., died Jan. 27.

Arthur W. Payne, 75, retired chairman, **Crane Packing Co.**, Chicago, died Feb. 5.

Get the BEST in tool and cutter performance with SIMONDS ABRASIVE CO.

Grinding Wheels



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For hardened and high speed steels, high carbon, high chrome and other alloys. For fast, cool cutting action with long wheel life, these wheels belong on *your* toolroom grinders. Made with W Borolon (special aluminum oxide abrasive) for fast stock removal and the finish you want without burning expensive steels. Engineered for true concentricity and good balance. Furnished in protective cellophane bags. For consistently superior results, standardize on Simonds W Borolon White Wheels.

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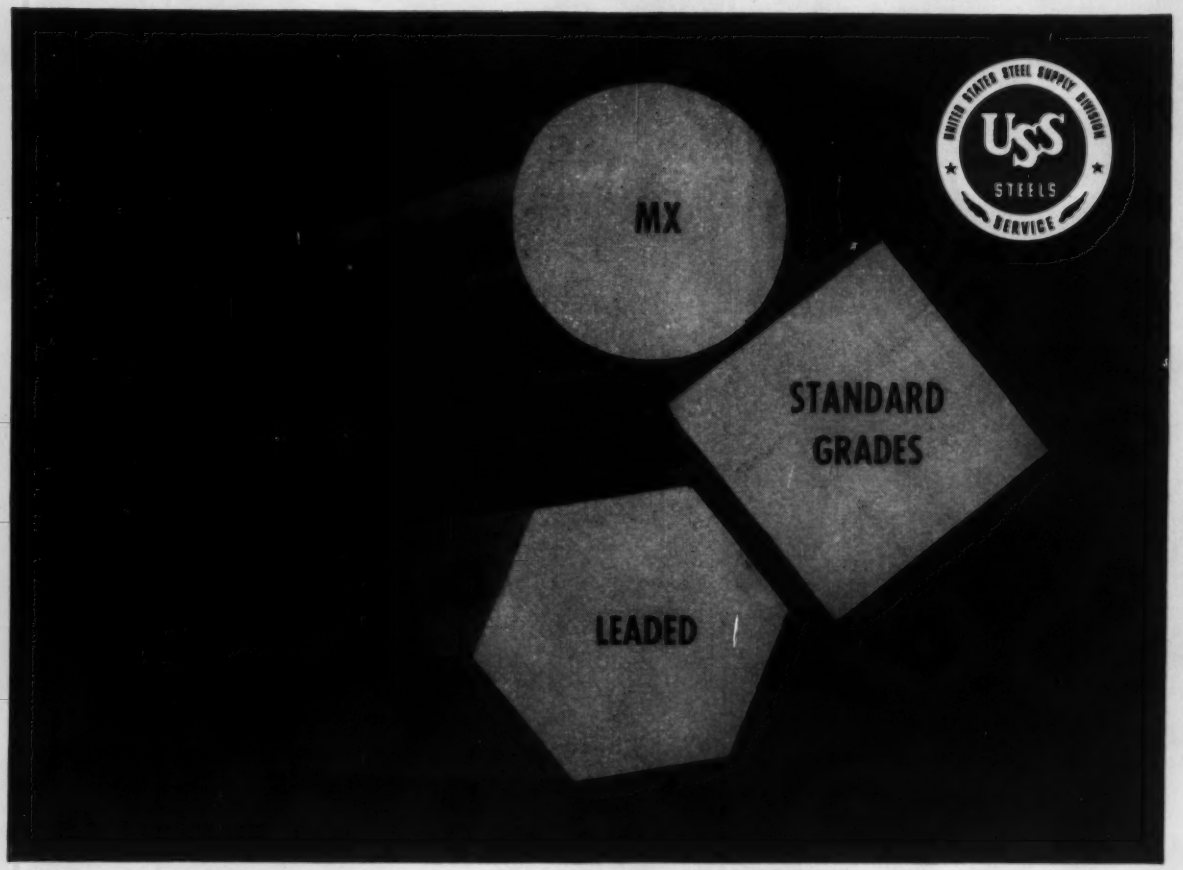

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General Offices: **208 So. La Salle St., Chicago 4, Ill.** **Warehouses and Sales Offices Coast to Coast**

UNITED STATES STEEL

AS&W Plans Mill

Wire fabric production facilities will add 40,000 tons of capacity to Cuyahoga Works

WELDED WIRE fabric will be produced in a mill to be erected in Cleveland by U. S. Steel Corp.'s American Steel & Wire Division. The plant will add up to 40,000 tons of finishing capacity to the firm's Cuyahoga Works, says Harry L. Jenter, district manager of operations.

Construction will begin next month and is scheduled to be completed within a year. Covering almost 53,000 sq ft, the mill is part of American Steel & Wire's expansion for this material, used extensively in highway construction, buiding walls, floors and roofs, concrete pipe and private driveways. The fabric increases the strength of a concrete slab about 30 per cent. New facilities for its manufacture have been installed recently in the division's Joliet, Ill., and Duluth plants.

Product Range—The fabric will be manufactured in Cleveland in widths up to 13 ft. The wire will range in thickness from 0.135 in. (about the size of a pail handle) up to ½-in. in diameter. The welding machines which turn out the fabric in continuous lengths will be capable of producing a pattern with squares as small as 2 in.

In addition to the main building, warehouse facilities will be constructed and some wire drawing equipment in existing wire mills will be replaced to accommodate the new mill's wire needs.

Alcoa Boosts Production

Aluminum Co. of America, Pittsburgh, began production five weeks ahead of schedule on current smelting capacity expansion in Texas. Expanded potroom facilities are in production at Point Comfort while the first of two new potlines at Rockdale is scheduled to begin operation by Mar. 1. The new production partially offsets reduced metal output at the company's Alcoa, Tenn., smelter, and makes up in small part for substantially curtailed imports from Canadian sources. In both areas, hydroelectric power shortages, due to drouth conditions, have forced temporary smelting production cutbacks.

When complete, the expansion will boost Rockdale capacity by 50,000 tons of primary aluminum annually; that of Point Comfort, by 25,000 tons. The increase represents more than 4 per cent of aluminum production in the U. S. last year. Alcoa smelting capacity is being increased by 11,000 tons annually at the company's Wenatchee and Vancouver, Wash., plants.

Hennessy Steel Corp. Formed

E. A. Hennessy and D. W. Moore organized Hennessy Steel Corp., 3622 S. Albany Ave., Chicago 32, Ill. The firm will warehouse and distribute sheet steel and tin mill products.

Enters Air Gaging Field

Dearborn Gage Co., Dearborn, Mich., established an Air Gaging Division to make and market recently developed column-type air gaging instruments and elements.

Builds New Jersey Warehouse

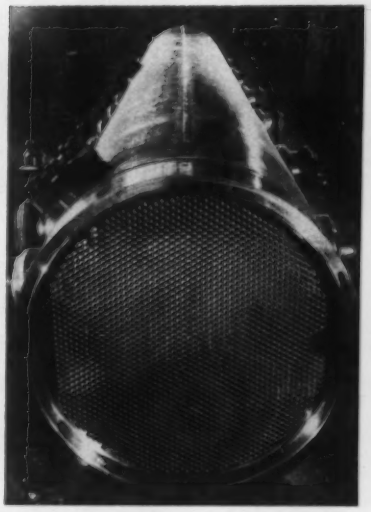
Rolled Alloys Inc., Detroit, is erecting a warehouse containing 16,000 sq ft in South River, N. J. Facilities will be provided for shearing sheets and sawing bars and plates. The company distributes specialty heat and corrosion resisting alloys exclusively. An inventory of 1 million lb is planned for the New Jersey plant. A. H. Wilson will be district manager; John Maxson, district sales manager.

Pitney-Bowes Enlarges Plant

Pitney-Bowes Inc., Stamford, Conn., will add 200,000 sq ft of manufacturing and office space to its postage meter plant. A two-year expansion program will cost about $1 million.

KeMalloy To Make Castings

KeMalloy Corp., Shreveport, La., is a new affiliate of Keokuk Steel Casting Co., Keokuk, Iowa, and Mid-Continent Steel Casting Corp., Shreveport. The new firm is equipped to produce high-alloy (including stainless) steel castings up to 1000 lb. Officers are: President, Karl G. Jansson; vice presidents, J. W. Dimond and J. H. Lowe; secretary and treasurer, W. H. Lenz.



Turns "A" Heat to Steam

A steam generator-heat exchanger for the nation's first civilian nuclear plant at Shippingport, Pa., is shown at Carteret, N. J., Works of Foster Wheeler Corp., New York. The 60,000-kw plant is being built by Westinghouse Electric for Duquesne Light Co. and Atomic Energy Commission

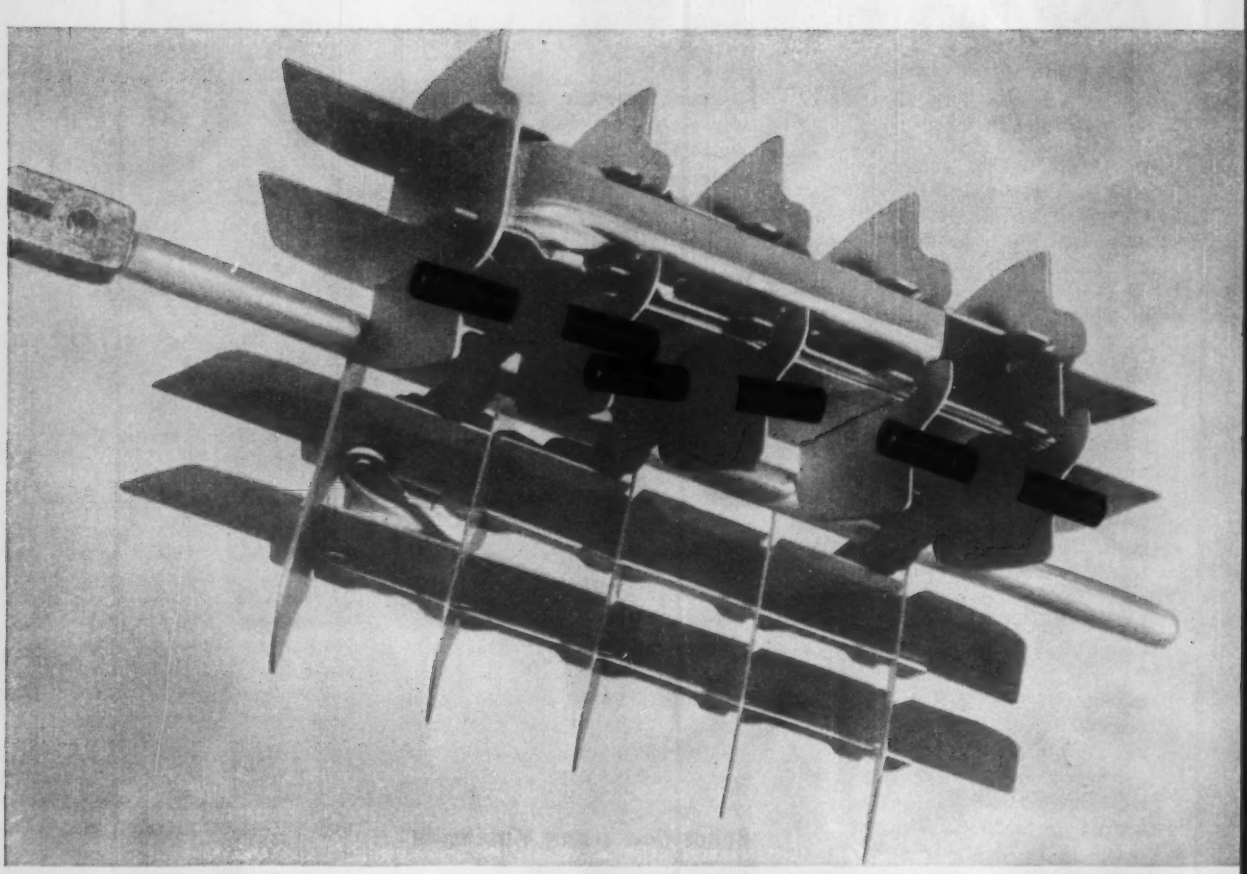
Standard Screw Buys Firm

Standard Screw Co., Bellwood, Ill., manufacturer of screw machine products and threaded fasteners, purchased Ravenna Metal Products Corp., Seattle, which specializes in precision assemblies. Moen Valve Co., a division of Ravenna Metal, will move its production facilities to Standard Screw's Elyria, O., division, Western Automatic Machine Screw Co.

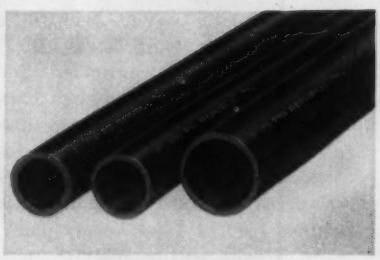
Ledkote Products Expands

A 10 per cent increase in productive capacity will result from expansion of facilities now under way at Ledkote Products Co. of New York Inc.'s plants at Long Island City and Port Jefferson, N. Y. Three drop hammers have been added and the tool and jig shop will be expanded at its Aircraft Division plant. A 15,000-sq-

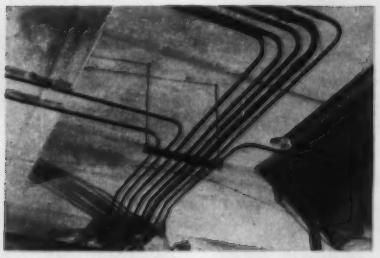
(*Please turn to page* 96)



CORROSIVE HEADACHES RELIEVED IN ASPIRIN PLANT with Republic ENDURO Stainless Steel. Because the chemicals, salycilic acid and acetic anhydride used in making aspirin powder attack ordinary metals, ENDURO Stainless Steel is used here for all equipment coming in contact with the powder during processing. If your equipment must resist corrosion and protect product quality and color, then specify Republic ENDURO Stainless Steel.



PERIODIC AND COSTLY PIPE REPLACEMENTS REDUCED with Republic's new plastic pipe — Semi-Rigid Kralastic. Extremely tough, it will absorb punishment without breaking or shattering and is highly resistant to most corrosive liquids and gases. Kralastic is ideally suited for both waste and process lines in the food processing and chemical industries. It is non-toxic. It's easy to handle, easy to join. Available in a wide range of working pressures.



DOUBLE PROTECTION FOR ELECTRICAL RACEWAYS in extremely corrosive atmospheres is provided by the tough, polyethylene coating over the galvanized finish of Republic Dekoron-Coated Electrical Metallic Tubing. Installation is simple. Moisture-tight joints are easily made, using threadless connectors and couplings. Joints are sealed with tape. Republic Dekoron-Coated E.M.T. reduces replacement costs. Cuts down-time of costly equipment. It costs less because it lasts longer.

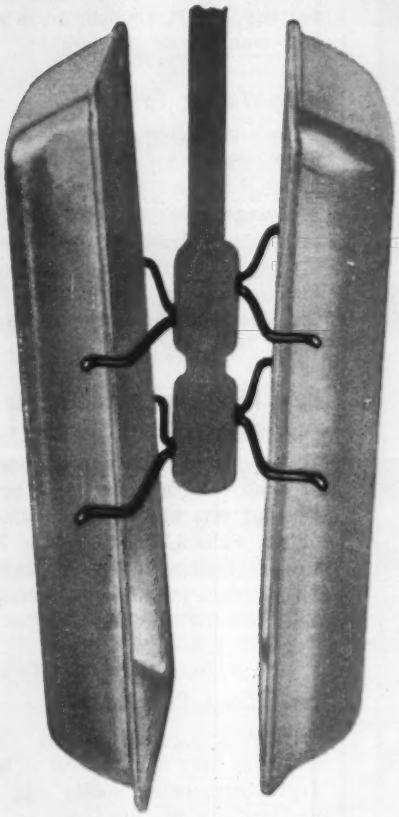
REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

REPUBLIC TITANIUM

displaces aluminum and increases anodizing rack life 100 times



Experimental anodizing racks utilizing Titanium have proved so successful that plans are being made for quantity production. New design will take full advantage of the properties of Titanium for the entire assembly.

Up to now, aluminum has been considered to be the most satisfactory rack material for the anodizing of ice trays and grids.

But, its use has been expensive and time consuming. For example, prior to each anodizing cycle a stripping operation is required to remove the anodic film formed for electrical contact on the previous cycle. And, during each anodizing and stripping cycle a considerable amount of aluminum is dissolved from the racks.

Recently one manufacturer of ice trays and grids switched to commercially pure Republic Titanium for use in anodizing racks. Titanium has proved to be an excellent rack material. It not only resists the chemical attack of the cleaning, etching, brightening and anodizing solutions, but also eliminates the need for the stripping operation. The thin, adherent oxide formed will conduct electricity and, therefore, does not have to be stripped off after each anodizing cycle.

While the initial cost of Titanium is higher than that of the former material, elimination of the stripping operation and increased rack life more than compensates for the increase in cost. The manufacturer's laboratory tests indicate that rack life will be increased more than 100 times.

Does this give you an idea for chemical equipment or for low-maintenance metal parts that must stand up to the most severe service? Then talk it over with Republic. You'll get complete information from the experienced leaders in corrosion-resistant metals.

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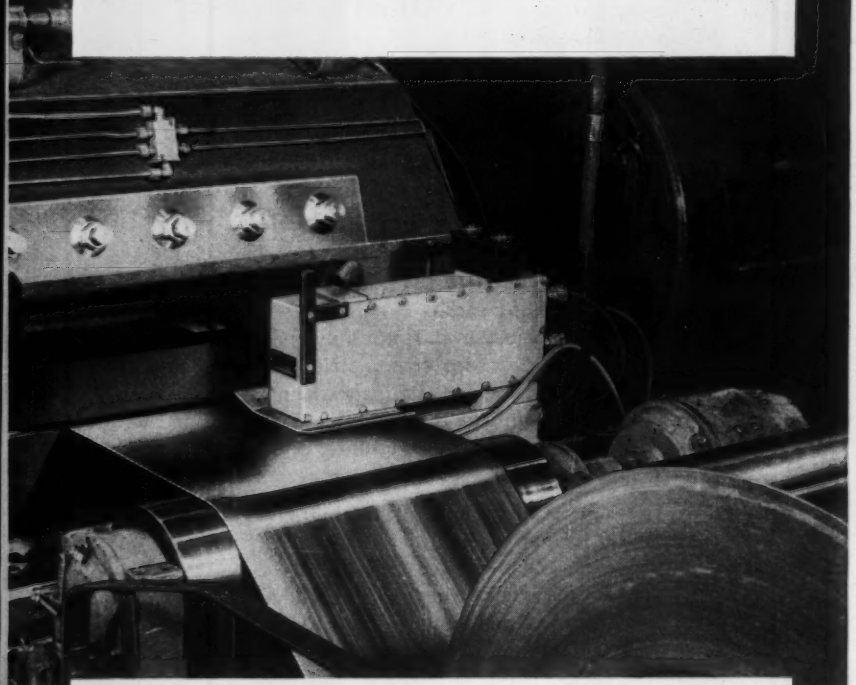

Take advantage of Pratt & Whitney's many years of experience in the design, manufacture and successful application of mill gages; a P&W Engineer is available to analyze your gaging problems, recommend the *right* equipment, and provide expert application engineering service. Complete, integrated, packaged systems — gages, controls and all other components — for fully automatic process control are available. Write today outlining your requirements.

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MACHINE TOOLS • GAGES • CUTTING TOOLS

(*Concluded from page* 93)

ft heat-treating facility and an automatic pickling line has been installed at the Port Jefferson plant.

GE Widens Computer Activities

General Electric Co., Schenectady, N. Y., has entered the industrial computer field. The move included integration of the firm's widespread computer operations (for specialized engineering and military lines) with the establishment of an industrial computer section at Electronics Park, Schenectady. H. R. Oldfield Jr. is general manager of the section.

Borg-Warner To Build

Borg-Warner Corp., Chicago, has appropriated $10 million for the erection of a chemical plant in Washington, W. Va. The plant will be used to increase production of a new type thermoplastic resin which is being produced by the firm's Marbon Chemical Division at Gary, Ind.

Buys Philadelphia Fabricator

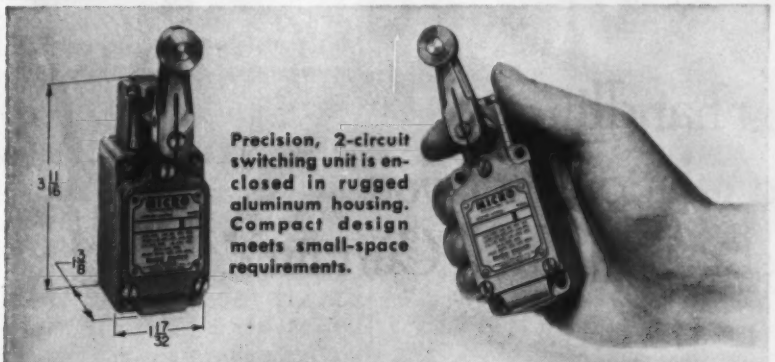
Philadelphia Steel & Iron Corp., Conshohocken, Pa., was sold to G. J. Keady, Bryn Mawr, Pa., president of Sharples Corp., Philadelphia. Philadelphia Steel & Iron makes stainless, alloy and carbon forged steel pipe flanges, grinding balls and high-pressure forged fittings.

B-L-H Corp. Reorganizes

Baldwin - Lima - Hamilton Corp. dissolved four subsidiaries to integrate them more closely into the nationwide organization as divisional units. Austin - Western Co., Aurora, Ill., is now the Austin-Western Works; Hydropress Inc., New York, is Loewy-Hydropress Division; Pelton Water Wheel Co., San Francisco, is Pelton Division; and O. S. Peters Co., Washington, is Electronics & Instrumentation Division. Executive appointments: William F. Boyle, West Coast vice president of the parent firm, general manager of the Pelton Division and vice president of Madsen Works, Los Angeles; C. M. Lippincott, general manager, Austin-Western Works, and vice pres-

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



Precision, 2-circuit switching unit is enclosed in rugged aluminum housing. Compact design meets small-space requirements.

Flush-mounted design which may be recessed into a cavity in the machine. Mounted on cover plate. Operating characteristics of both switches are identical.

Here is a small, 2-circuit limit switch to meet a wide variety of machine tool applications

This MICRO precision switch is designed to meet every requirement for a compact 2-circuit switch for use as a limit, safety or interlock switch on complex production equipment.

It has small size, extreme versatility, precision, reliability and ruggedness. All moving parts and the switching chamber are completely sealed, protected from wear or becoming fouled. Versatile field adjustability permits its use in practically any type of application or location.

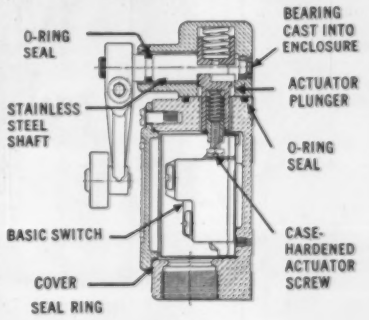
Two-circuit contact arrangement allows flexibility in circuit design. Reliability of the precision, snap-action unit assures accurate repeat operations throughout many millions of hard, fast actuations. Although small and compact in size, this switch is not only a precision instrument. It is designed and built to stand the most severe abuse.

The electrical rating is: 10 amperes 120, 240 or 480 volts a-c; ½ H.P. 115 volts a-c; 1 H.P. 230 volts a-c; .2 ampere 115 volts d-c; .1 ampere 230 volts d-c; .04 ampere 550 volts d-c. Pilot duty rating is: 600 volts a-c, max.

Like many other precision switches in the MICRO SWITCH line, this versatile 2-circuit switch is also an ideal component for installation on present plant equipment. MICRO precision switches make production machinery safer, more automatic and more productive.

As shown above, this switch is also available in a flush-mounted design which may be recessed into a cavity in the machine. The operating characteristics of both switches are identical.

Seals Provide Maximum Protection



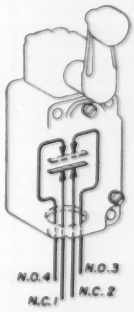
Sealing is provided by use of O-ring seals on the actuator shaft and between the actuator head and the housing. A synthetic rubber ring seal is provided for the cover. These seals provide maximum protection against entrance of dust, oil and other liquids. The switch meets NEMA specifications for an oil-tight pilot device.

Adjustable Head Assembly

The switch is easily mounted in almost any location. The user can remove the head and locate it in any of 4 positions (as illustrated). The actuator arm is field adjustable to any position through 360° and can be adjusted to operate in either direction or in both directions.

Contact Arrangement

Contact arrangement of the basic switching unit is double-throw, two-circuit, single-pole, double-break. A single-pole, double-throw circuit can be obtained by tying together one normally-open and one normally-closed terminal and using this connection as the common terminal.



MICRO precision switches are sold by distributors in key cities everywhere. For engineering assistance, call the MICRO SWITCH branch nearest you.

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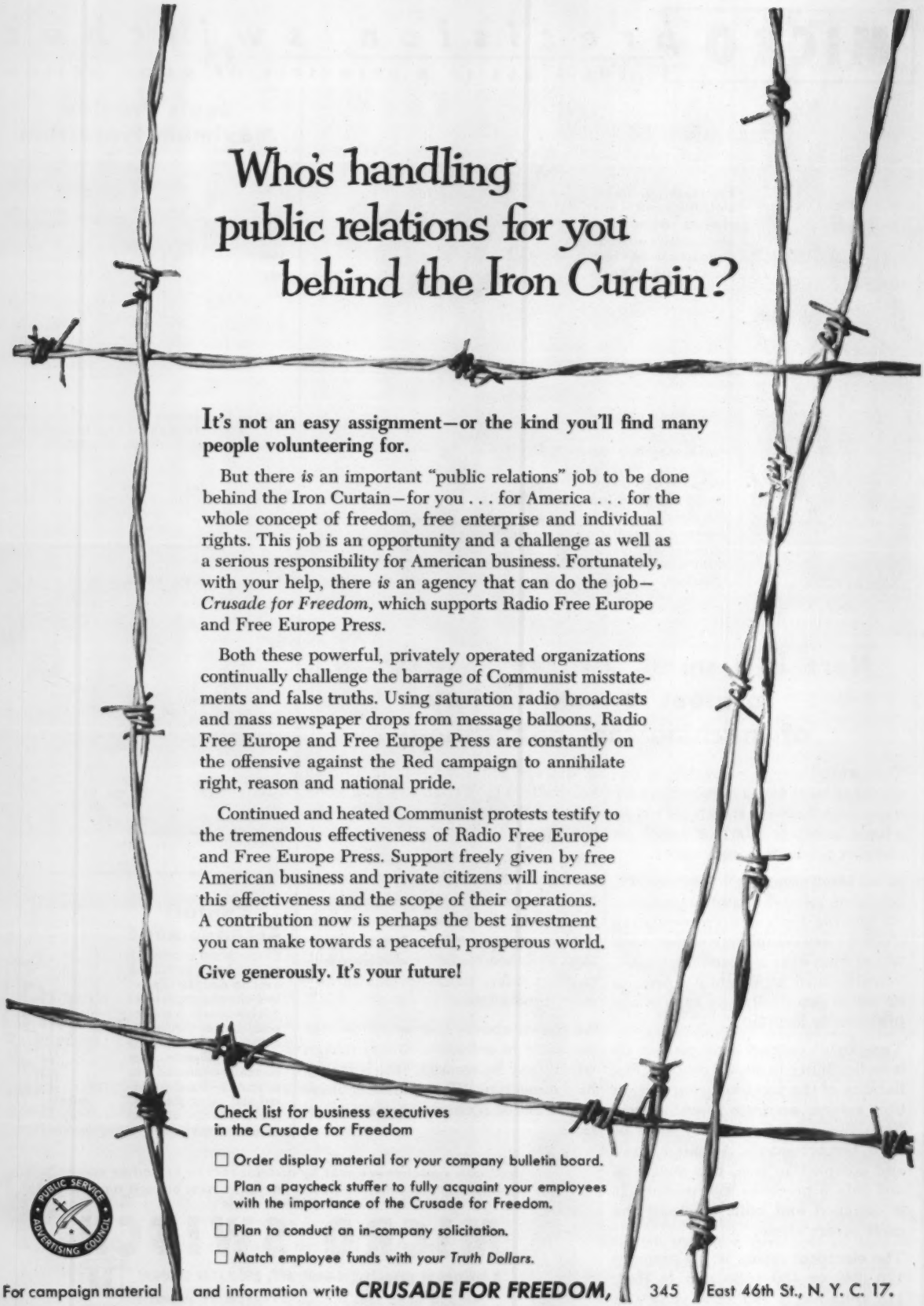

Who's handling public relations for you behind the Iron Curtain?

It's not an easy assignment—or the kind you'll find many people volunteering for.

But there *is* an important "public relations" job to be done behind the Iron Curtain—for you . . . for America . . . for the whole concept of freedom, free enterprise and individual rights. This job is an opportunity and a challenge as well as a serious responsibility for American business. Fortunately, with your help, there *is* an agency that can do the job—*Crusade for Freedom,* which supports Radio Free Europe and Free Europe Press.

Both these powerful, privately operated organizations continually challenge the barrage of Communist misstatements and false truths. Using saturation radio broadcasts and mass newspaper drops from message balloons, Radio Free Europe and Free Europe Press are constantly on the offensive against the Red campaign to annihilate right, reason and national pride.

Continued and heated Communist protests testify to the tremendous effectiveness of Radio Free Europe and Free Europe Press. Support freely given by free American business and private citizens will increase this effectiveness and the scope of their operations. A contribution now is perhaps the best investment you can make towards a peaceful, prosperous world.

Give generously. It's your future!

Check list for business executives in the Crusade for Freedom

- ☐ Order display material for your company bulletin board.
- ☐ Plan a paycheck stuffer to fully acquaint your employees with the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with your *Truth Dollars.*

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ident of the parent firm; Erwin Loewy, general manager of the Loewy-Hydropress Division, and vice president of Baldwin-Lima-Hamilton Corp.; L. K. Hyde, general manager, O. S. Peters plant of the Electronics & Instrumentation Division.

Surface Combustion Expands

Surface Combustion Corp. will construct a building adjacent to its factory in Toledo. It will increase productive capacity of the plant by about one-third. The expansion is to meet increased demand for the firm's industrial furnace equipment.

New Firm To Make Gears

Overton Gear & Tool Corp. has completed installation of equipment in its plant at Addison, Ill. The new firm is making spur and helical gears. Carl E. Overton is president; John F. Boesen, works manager; and Thomas Colley, production manager.

Selas Opens Dresher Plant

Selas Corp. of America moved from its Philadelphia site to a million-dollar plant in Dresher, Pa. The firm designs and makes automatic heat-treating, brazing, melting and other heat-processing equipment.

Combustion Engineering Builds

Combustion Engineering Inc., New York, will build a plant for the design and production of nuclear power reactors and for the construction of reactor cores and related atomic fuel elements at Windsor, Conn. Cost: $5 million.

Sheffield Buys Distributor

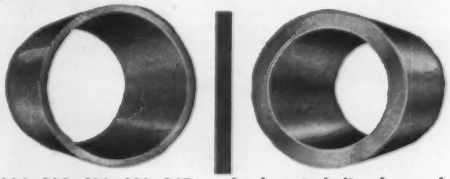
Sheffield Corp., Dayton, O., purchased Erwin A. Slate Inc., machine tool sales and service engineering company at Gasport, N. Y. Sheffield produces scientific controls for automatic production, machine tools, threading tools, precision gages and a variety of related machines and parts. The Gasport firm also will act as representative for McCroskey Co., manufacturer of cutting tools. Er-

(*Please turn to page* 102)

looking for the right tube in WELDED STAINLESS?

Check Standard's Complete Range of tube and pipe sizes!

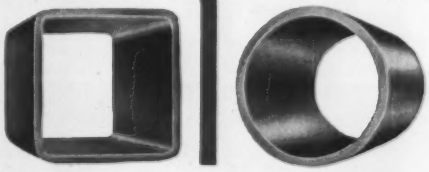
Whether it's for a pressure, mechanical, sanitary or ornamental use – Standard offers you a convenient "one source" answer to your welded Stainless Steel Tubing need.



TUBE SIZES: ¼" to 4" OD .025 to .148

PIPE SIZES: ⅛" to 2" IPS Schedule 40

TYPES: 430, 302, 304, 309, 316, 321, 347; and others including low-carbon grades.



SHAPES: Squares, Rectangles and Special Shapes

PIPE SIZES: ⅛" to 4" IPS Schedules 5 & 10

Send for Stainless Folder! Our engineers will gladly assist you in your selection of the tube best suited to your needs! Write today!

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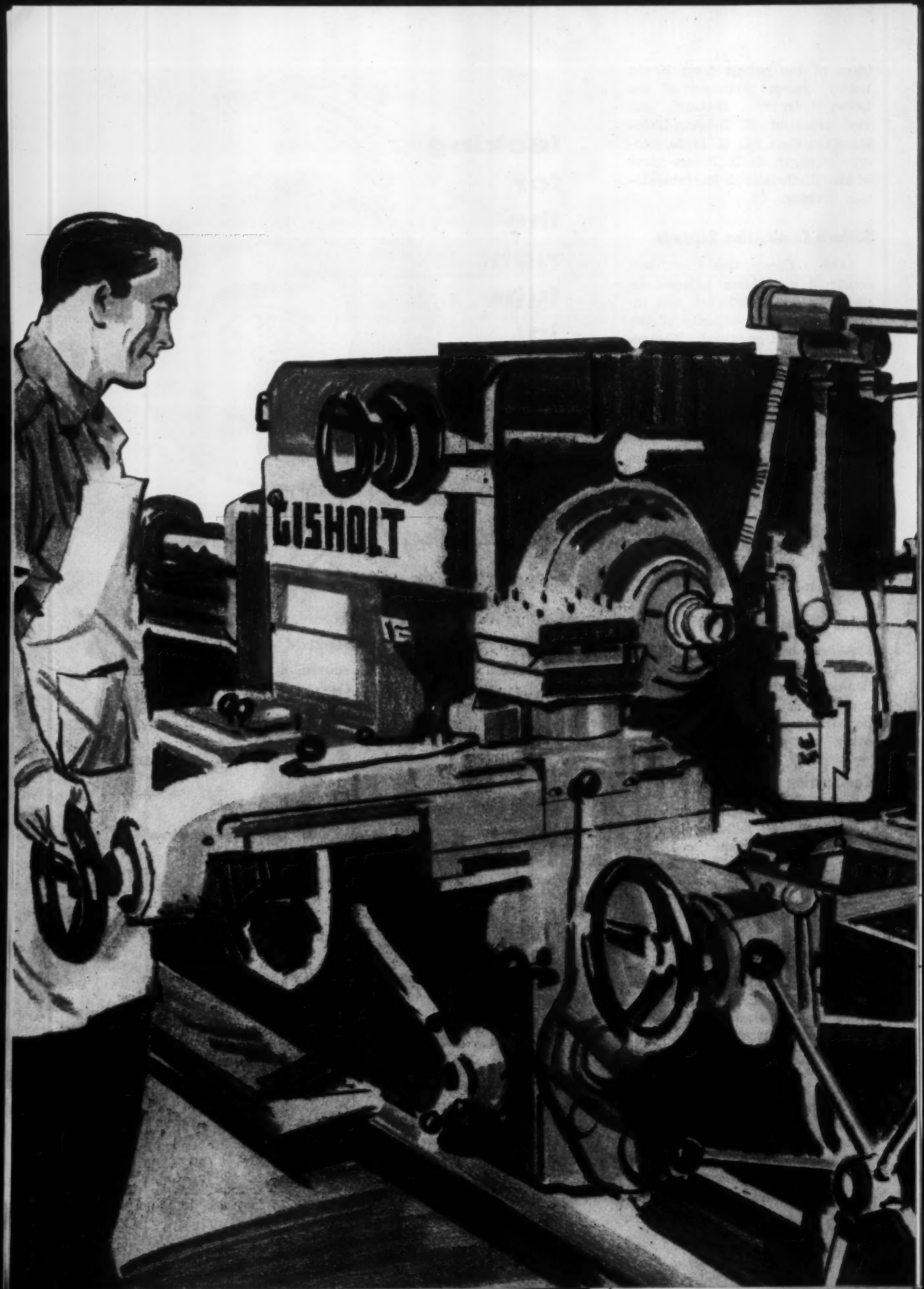
- WELDED CARBON STEEL MECHANICAL TUBING
- BOILER AND HEAT EXCHANGER TUBING
- EXCLUSIVE "RIGIDIZED" PATTERNS


GISHOLT

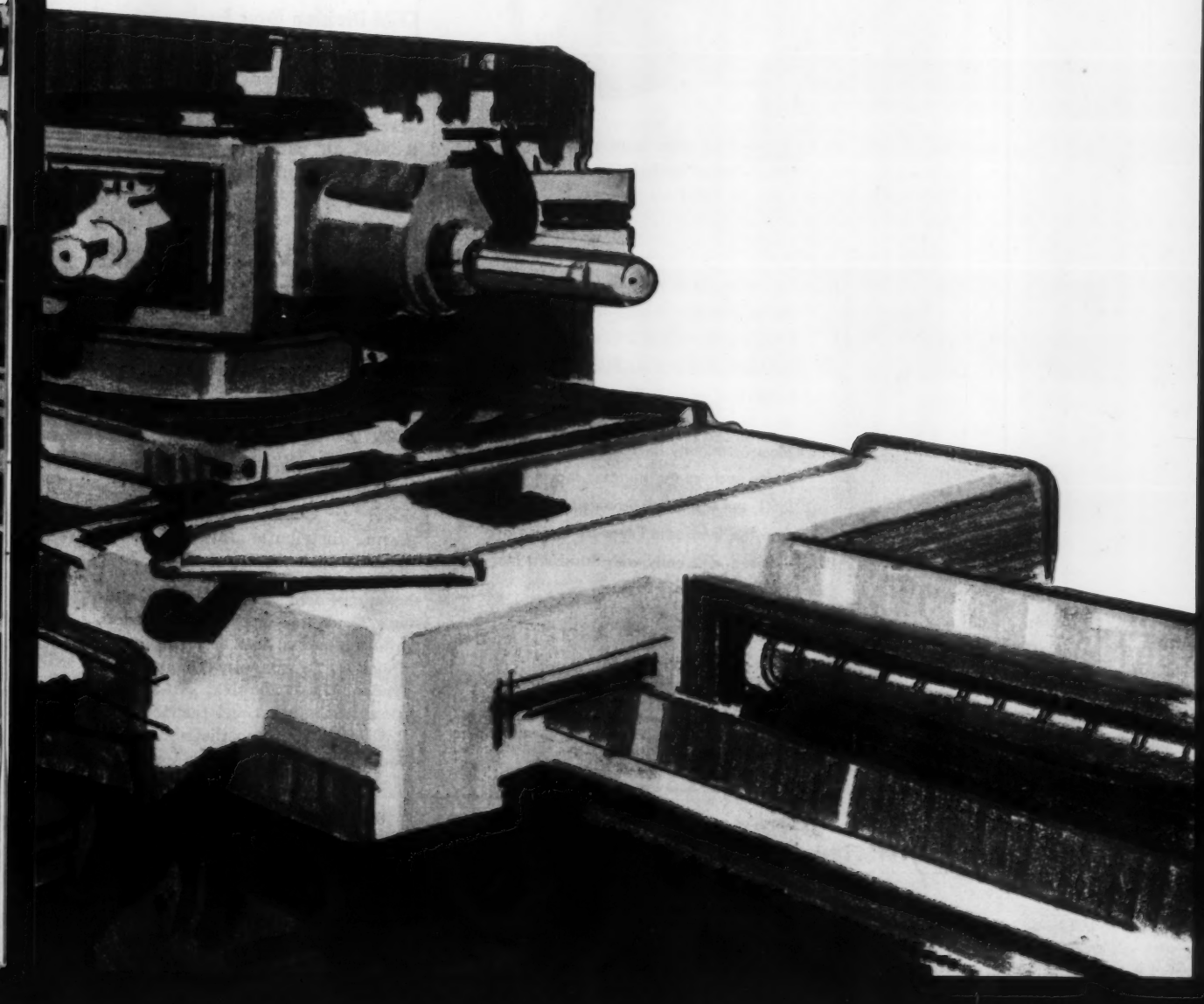
GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

MASTERLINE
GISHOLT SINCE 1887

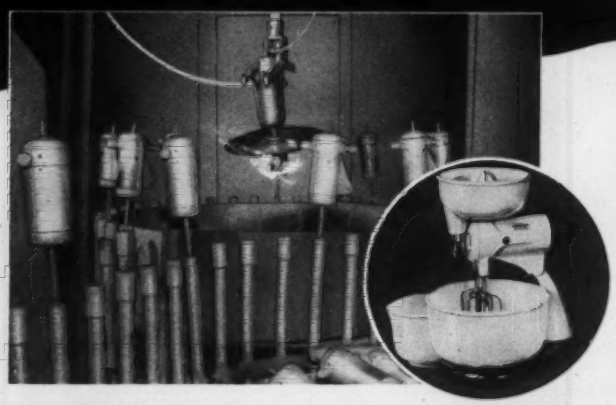
Throughout the metalworking industry, Gisholt High Production Saddle Type Turret Lathes are known for simpler controls, ease of operation, wide adaptability and sturdy construction. Gisholt continues to set the pace with the new MASTERLINE series—outstanding in ability to handle rugged jobs, with ample power and massive weight to withstand deep cuts at punishing feeds without vibration. Let us tell you more about these machines—and how they can be applied profitably to your manufacturing processes.

Gisholt Machine Company, Madison 10, Wisconsin

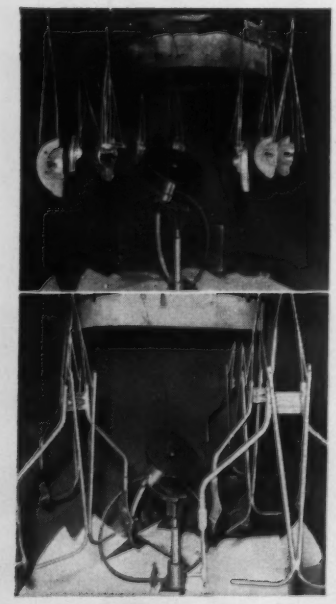
Look ahead—keep ahead—with Gisholt



Sunbeam is particular about the uniform high quality finish on their products, so SUNBEAM relies on RANSBURG NO. 2 PROCESS Electrostatic Spray Painting



Along with improving the quality of the brilliant white finish on Mixmaster parts, an 80% paint savings was achieved when SUNBEAM switched from hand spray to RANSBURG Electrostatic Spray Painting



Protective clear lacquer is applied to upper saw guard (upper left) with RANSBURG NO. 2 PROCESS on this line in SUNBEAM's plant 2, Chicago. Other hardware items, including the Drillmaster and Sunbeam Sander are lacquer-coated electrostatically here. Lawn mower parts, such as the handles shown (lower left), the Rain King lawn sprinkler base, and the Sunbeam Fryer base also are painted efficiently with Ransburg No. 2 Process Electro-Spray.

Regardless of the type of product you manufacture, if it's painted—and if your production justifies conveyorized painting—you should look into the savings and improved quality which can be yours with one of the Ransburg Electrostatic Processes. May we tell you about complete Ransburg services, including the test painting of your products in our laboratories?

Write to Dept. S.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

(*Concluded from page 99*)

win A. Slate is manager of Sheffield Corp.'s subsidiary.

Ziv Steel Enlarges Warehouse

Ziv Steel & Wire Co., Chicago, erected an addition to its Detroit warehouse.

Newcomer Opens Detroit Office

Newcomer Products Inc., Latrobe, Pa., maker of cemented carbides and carbide cutting tools, opened a sales office at 16455 Hamilton Ave., Detroit 3, Mich.

Ansonia Wire To Build

Ansonia Wire & Cable Co., Ansonia, Conn., will start production at Cumberland, R. I., in April when its $1-million plant is completed.

CF&I Division Buys Equipment

Colorado Fuel & Iron Corp.'s Wickwire Spencer Steel Division, Buffalo, awarded a contract to Gas Machinery Co., Cleveland, to install a 50-ft air patenting furnace and a 26-ft lead quench pan for its wire mill on River road, Buffalo.

REPRESENTATIVES

Carl Hirschmann Co. Inc., Manhasset, N. Y., was appointed agent for **F. Blaesi & Co.**, Soleure, Switzerland. The Blaesi firm makes a copy grinding machine.

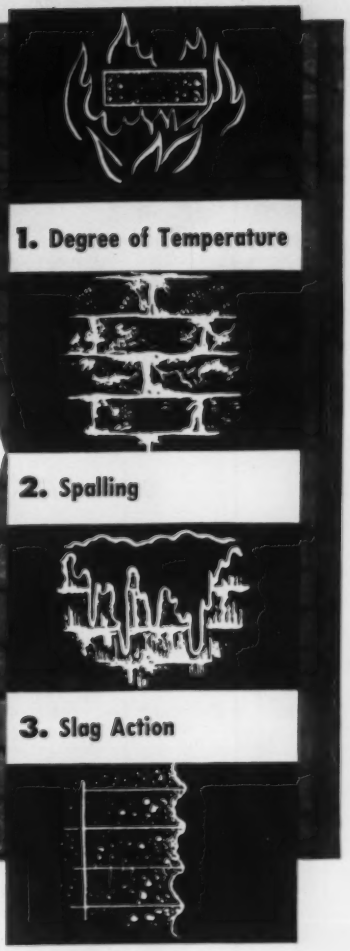
Adamas Carbide Corp., Kenilworth, N. J., appointed Ellsworth Steel & Supply Co., Stratford, Conn., distributor for its line of carbide tools and tool tips.

H. K. Porter Company Inc.'s Vulcan Crucible Steel Co. Division, Aliquippa, Pa., tool steel producer, appointed Grammer, Dempsey & Hudson Inc., Newark, N. J., and Passaic County Steel Service Inc., Paterson, N. J., as distributors in the New York metropolitan and New Jersey areas.

Sargeant & Wilbur Inc., Pawtucket, R. I., maker of industrial heat-treating furnaces, atmosphere generators, ammonia dissociators,

Profitable trends in the use of refractories

Laclede's 5-Step Approach results in sound, economical refractory selection



The type of refractory most economical for your job is generally determined by five factors: (1) Degree of temperature, (2) Spalling, (3) Slag action, (4) Abrasion, and (5) Load.

A periodic review of these factors frequently results in savings both in time and money. You may find that Laclede-Christy offers a particular type of refractory that substantially increases service life. Or you may find your heating conditions have changed—suggesting a change in refractories. Or you may have a special problem which Laclede's 5-Step Approach will help you solve.

Laclede offers many types and grades of refractories you may need. Assistance in the selection of the best and most economical type for your purpose is part of Laclede's specialized service.

Make profitable use of this service. Call your nearby Laclede representative.

Write for Laclede's Refractory Selection Guide.

LACLEDE-CHRISTY COMPANY DIVISION

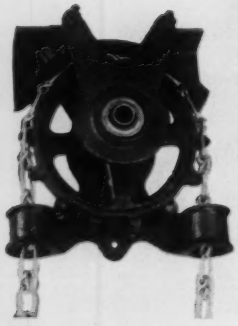
H. K. PORTER COMPANY, INC.
2000 Hampton Ave. • St. Louis 10, Missouri
Mission 7-2400

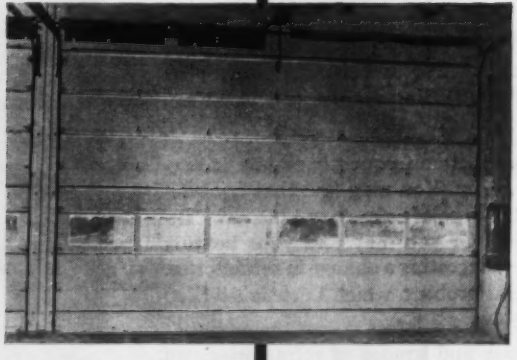
How About Malleable?

"Sturdiness and permanence pay," says a leading overhead door manufacturer.

Here is another manufacturer using malleable iron castings to improve his product. Malleable is noted for its tough strength, wear resistance, and ability to be produced in intricate shapes close to final form. Its excellent machinability, where machining is required, means trouble-free and low-cost finishing.

This versatile material has been utilized for 130 years in a wide range of applications and in every industrial field.





Call a malleable foundry and review your products with their engineers. They can often give you valuable suggestions. Or write to the Malleable Founders' Society.

Parts photos by courtesy of Quincy Mfg. Co., Tiffin, Ohio

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building — Cleveland 14, Ohio

gas conditioning equipment and allied equipment, appointed Masten-Wright Corp., New Haven, Conn., as its export manager.

Westinghouse Electric Corp.'s Sturtevant Division, Pittsburgh, appointed Industrial Supply Division of Forest Products Co., Kalispell, Mont., and Somers, Fitler & Todd Co., Pittsburgh, as distributors for its ventilating sets, industrial fans and unit heaters.

R. P. Adams Co. Inc., Buffalo, appointed R. A. Mueller & Associates, Cincinnati, representatives for its products, including heat exchange equipment and filters.

Perkin Engineering Corp., El Segundo, Calif., appointed Lowry Dietrich Co., Pittsburgh, representative for its line of direct-current power supplies.

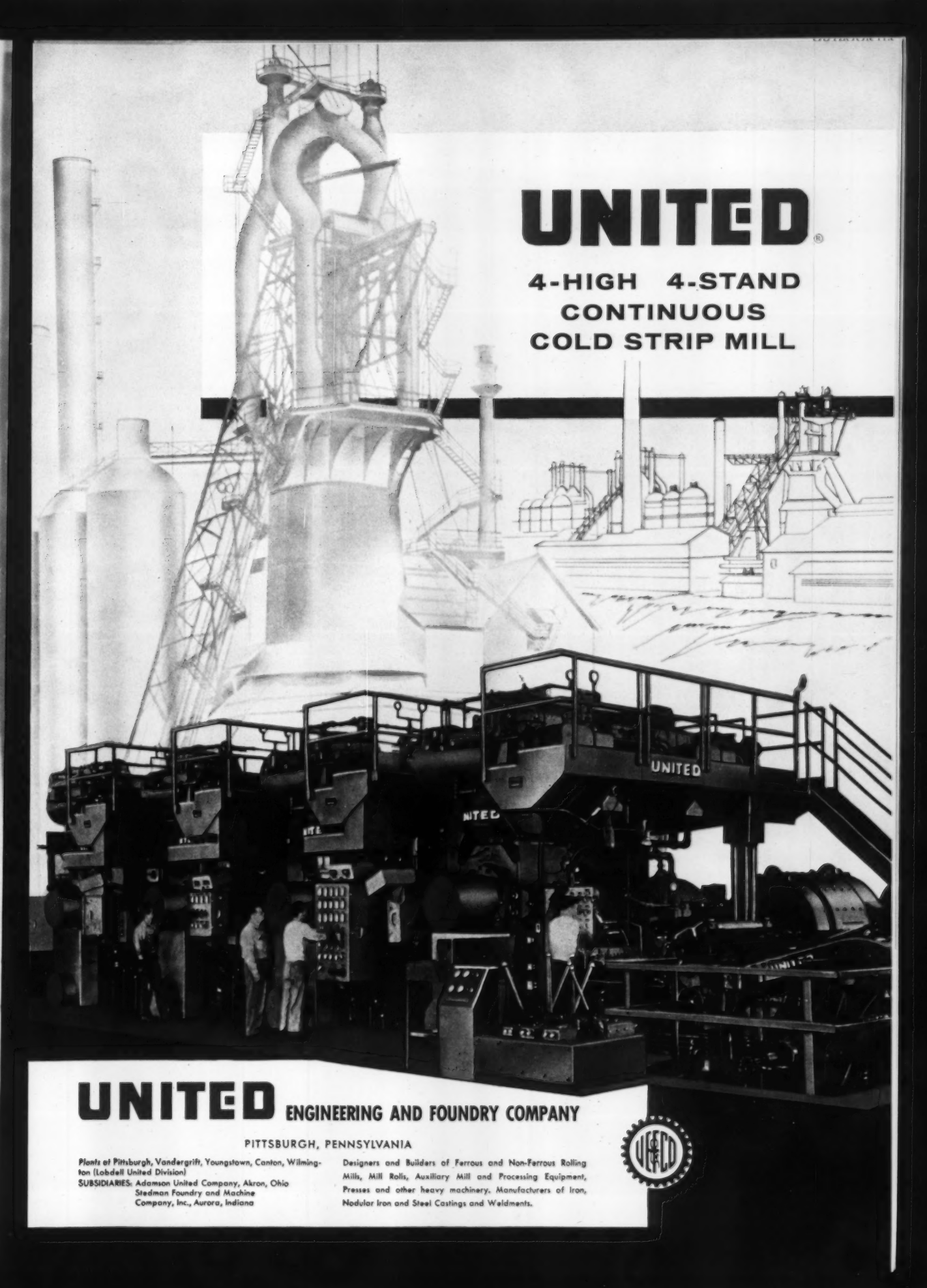
NEW ADDRESSES

Aero Research Instrument Co. will move to 315 N. Aberdeen St., Chicago 7, Ill.

ASSOCIATIONS

Air Moving & Conditioning Association Inc. was formed by 46 manufacturers of air moving and conditioning devices. Officers are: President, R. W. Nelson, American Air Filter Co. Inc., Louisville; vice presidents, J. F. Snow, Davidson Fan Co., Newton, Mass., and C. C. Cheyney, Buffalo Forge Co., Buffalo; secretary-treasurer, W. H. Rietz, Ilg Electric Ventilating Co., Chicago. Association headquarters at 2159 Guardian Bldg., Detroit 26, Mich., is under the direction of L. O. Monroe, executive vice president, assisted by R. E. O'Rourke.

Small Lot Metal Stamping Institute elected E. J. Skramstad, Federal Tool & Mfg. Co., Minneapolis, president, succeeding M. E. Lorenz, H. P. L. Mfg. Co., Cleveland. Re-elected are: Vice president, Richard Boker, V. A. Boker & Sons, Minneapolis; secretary-treasurer, G. C. Wick, W. L. S. Stamping Co., Cleveland.



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington (Lobdell United Division)

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Two views of heavy duty boring machines equipped with U. S. PowerGrip TIMING Belts and pulleys. Note the teeth in the belts and in the pulleys. They transmit the power of 2 motors on each machine, and are subjected to the normal heavy shock loads inherent in this type operation.

A leading auto plant reaps savings in production time and labor... by installing U. S. *PowerGrip* "TIMING"® Belts

When this auto plant changed its boring operation for these machines, it also changed its power transmission to U. S. PowerGrip TIMING Belts. Immediately, these advantages were gained:

- Pulleys and belts were reduced in number on each machine from 6 to 4.
- These U. S. PowerGrip TIMING Belts have been on the job more than six times as long as previous belts—yet show *no sign of wear!*
- The machines are now far more efficient. They deliver a more uniform speed and, because they do not stall, they give a better finish to the work.

So convincing was the saving in production time and the reduction in maintenance and replacement of parts, that the management of the auto plant has now equipped all of this type boring machine with U. S. PowerGrip TIMING Belts and pulleys. A development of United States Rubber Company, the U. S. PowerGrip TIMING Belt has grooves which fit into teeth in the pulleys—with perfect non-slip grip and a uniform transmission of power. This belt has revolutionized power transmission in hand tools, lathes, drill presses, saws, electric typewriters and thousands of other applications. The absence of metal-to-metal contact makes lubricants and oil-retaining housings unnecessary. The smaller pulleys permit very short centers and high ratios. Light weight permits very high speeds, yet with its non-slip grip the belt can handle speeds so slow as to be almost imperceptible to the eye. Because there are no friction-creating joints, no slippage, no lubricated drag, the U. S. PowerGrip belt has an efficiency close to 100%. Obtainable at any of our selected distributors or 27 "U. S." District Sales Offices or write us at Rockefeller Center, New York 20, N. Y., for free catalog.

US RUBBER

Mechanical Goods Division

United States Rubber

Technical Outlook

COLD CURE—A new adhesive which cures at room temperature requires only low pressure for metal-to-metal bonding. It was developed by Bjorksten Research Laboratories Inc. for the Air Force, which wants it for field repair of airframes. It is basically methacrylic acid and methyl methacrylate, and is designated P-262A.

BEST BOLTING—At Cornell, light-gage steel structures with bolted connections are being tested to find the influence of different plate thicknesses and bolt arrangements. American Iron & Steel Institute is sponsoring the research.

TV X-RAY—Industrial x-ray, amplified by television techniques, was demonstrated by GE at the winter meeting of the AIEE. Its advantages: Instant viewing, high sensitivity, remote viewing in broad daylight, permanent records available on tape or by photography, unlimited number of viewing stations, magnification without loss of detail and operation of the tube at 250 volts.

KING SIZE BLASTER—Morgan Engineering Co., Alliance, O., has a new shotblast room for 40-ton weldments. It's next to its new furnace for annealing large weldments (STEEL, Dec. 5, 1955, p. 145). Abrasives blown from a nozzle under 85 to 100 lb of air pressure take off scale formed during stress relieving and remove weld spatter, paint and grease.

RESEARCH SAVES—Radiation and industrial electronics are two of the brightest spots in the 1956 research picture, says Ernest E. Johnson, manager, GE's General Engineering Laboratory, Schenectady, N. Y. "New techniques and devices developed in laboratories will save industry more than $1 billion this year," he predicts. He sees the development of new automatic equipment for fabricating raw materials, flaw detection, automatic machining and control of complex manufacturing processes.

TIGHT LITTLE CELL—A new silver-cadmium cell combines the small size and light weight of a silver-zinc battery with the long life of a nickel-cadmium battery. Its developer: Yardney Electric Corp.

H-BOMB USES—AEC's new regulation to give companies access to restricted data on atomic energy went into effect this month. Included in the categories of restricted data available is information on controlled thermonuclear processes. AEC hopes this will encourage industrial research to solve some of the "enormously difficult problems" involved in using energy of the H-bomb for peaceful purposes.

TREATING STAINLESS—Treatment of stainless by a new photochemical process gives the surface a hard, ductile, noncrystalline structure. Developer of the process, Ateenate Inc., Boston, Mass., says it alters the chemical composition of the steel. The jet black coating is an integral part of the metal and is expected to be used for name plates, dials, etc.

NEW STANDARDS—The Bureau of Standards has six new standard samples of stainless steel for calibrating and checking spectrochemical methods of analysis. They are certified for six major and minor elements: Manganese, silicon, copper, nickel, chromium and molybdenum.

Metalworking Outlook—p. 59 *Market Outlook—p. 163*

The whole company benefits when . . .

The Brass Takes a Welding Course

"WELDING can be put to greater and more effective use if management and supervisory personnel have a better working knowledge of the process."

That's the major premise behind a welding course at Baldwin-Lima-Hamilton Corp., Philadelphia. For works managers, supervisors, inspectors, design and methods engineers, production and industrial superintendents and union stewards, it has more than paid for itself in cost-saving redesign of several products.

Setup—Each class (usually ten people) has a 2-hour session each week (a 15-minute quiz on the previous week's work, a 45-minute lecture and one hour of practical demonstration). No attempt is made to make welding technicians out of the students but the 12-week course gives them sufficient knowledge to take full advantage of welding as a fabricating tool.

Curriculum—Here's how the sessions cover the subject:

1. Fundamentals of welding methods.
2. Safe practices in handling welding equipment.
3. AWS electrode classification; economy in the use of electrodes.
4. NEMA standard color identification of electrodes.
5. Common welding difficulties and how to handle them.
6. How to pick the right electrode for the job.
7. Trouble shooting and how to prevent waste in welding.
8. AWS standard welding symbols and how to use them.
9. Good and bad joints: The do's and don'ts of weld design.
10. Cutting, burning and gouging.
11. Stud welding.
12. Inspection: Visual, dye penetrant, Magnaflux and x-ray.

Payoff — Armed with practical welding know-how, supervisory personnel and inspectors can quickly spot welding troubles, operator faults and unsatisfactory work. Being more capable supervisors, they are shown more respect by the welders. Job standards and specifications are more easily interpreted and enforced.

For the designer, the course stresses the importance of know-

ing load and load characteristics. This includes the manner in which the load is applied, whether it is steady, variable or sudden. Costs of joint preparation and welding are explained, too, so that the designer can compare fabrication costs.

Started in 1950—The course is an offshoot of one developed in 1950 to train welders for M-47 tank production. Results were so outstanding that the course was broadened to reach all levels of management.

So many applications were received, it was necessary to schedule two classes a day. Many applicants offered to attend after working hours. To date, 132 have completed the training, and 36 are attending classes.

SAMPLE COURSE . . .

WELDING is only one of many ways of joining. To know welding, you must know joints.

There are four fundamental joints: Edge, butt, lap and tee. Likewise, there are four fundamental welds: Bead, butt, fillet and plug. Don't confuse joints with welds.

Many variations of these fundamental forms of joints and welds are used. Occasionally, a design or application limits the selection to one; more often, several will do the job equally well.

Of course, the best weld is the cheapest one that will do the job. These factors must be considered:

1. The kind of load—compression or tension; combinations of bending, fatigue or impact stresses.
2. How is the load applied—steadily, variably or suddenly.
3. Cost of joint preparation and welding.
4. Warping, ease of welding and appearance.

Buttwelds are preferred to single and double-fillet lap joints. They are used when a joint is under appreciable tension, bending and fatigue stresses. It is best to use a buttweld rather than a single or double-fillet weld:

1. When overlapping parts would decrease heat conduction.
2. When a liquid or air-tight joint is required.
3. When corrosion might occur between overlaps.
4. When it is necessary to save weight.

Buttwelds have some disadvantages. They cost more (machined-edge types), are harder to fabricate in assemblies and require greater operator skill than fillet welds. Smaller electrodes and lower current must be used for the root passes (bottom or first passes of the weld). Buttwelds shrink more and leave greater internal strains.

Here Are the Results

1. Designers find new methods of assembling and welding for more economical production
2. Production supervisors do a more adequate inspection job to assure top-quality work
3. Fabrication problems are minimized, production rate increased and rejections reduced
4. Work can be planned more intelligently
5. Design engineers give more thought to welding possibilities
6. Plant production supervision is strengthened
7. Welders have more respect for supervisors who know welding
8. Teamwork between design and production departments is improved
9. Costs are reduced

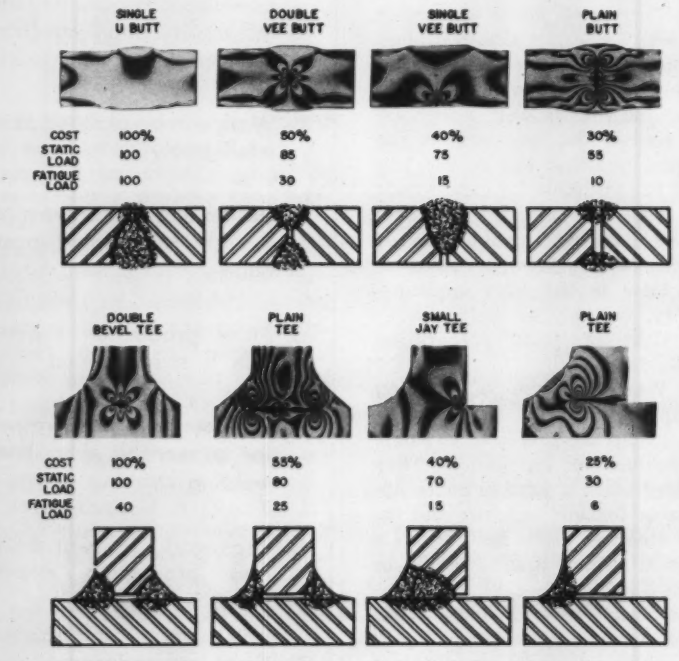
do

- Use low-hydrogen electrodes, submerged arc welding, preheating or postheating treatments: These methods eliminate internal defects, microcracks, gas pockets, slag inclusions, excessive surface ripples or roughness
- Specify the base and weld metals that the service requires
- Strive for smoothness. Avoid stress raisers like undercutting, cracks, spatter, strike marks and other surface imperfections
- Dress the weld at critical points to get satisfactory smoothness
- Prepare, fit and weld with methods that produce sound welds
- Use multipass cascade welding for fillet welds on thick material

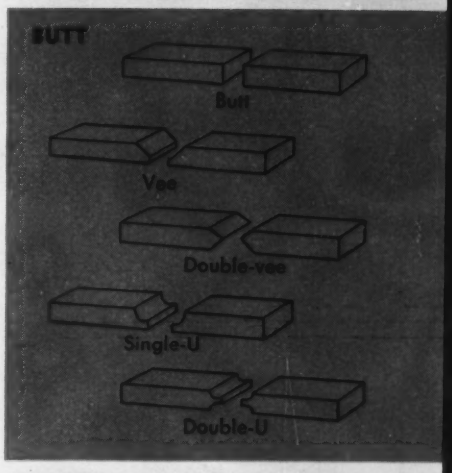
don't

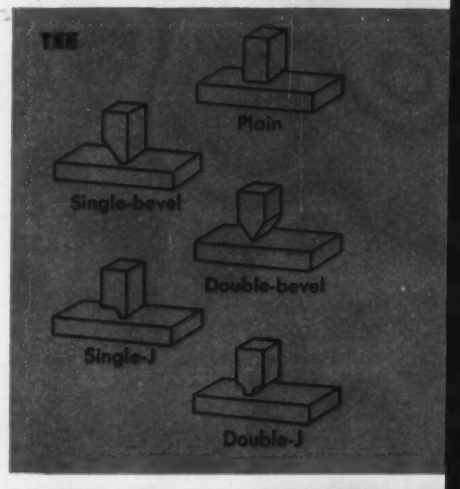
- Leave undercuts
- Leave incomplete root penetration
- Use intermittent welding (use smaller continuous weld)
- Leave end defects in fillet welds (fill the weld crater)
- Strike the arc outside of the weld area
- Peen the first or last layers of a weld
- Overweld

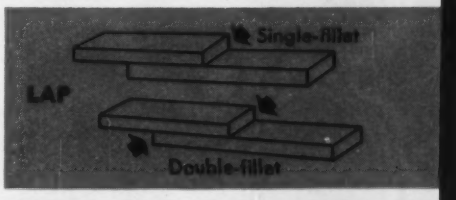
How Weld Quality and Cost Compare

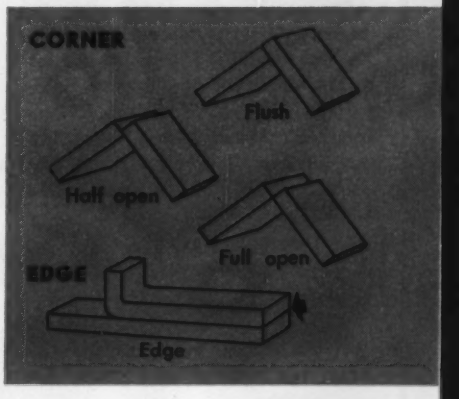


Joints and Welds









Joint	Type Load	Thickness	Machining Preparation	Cost of Machining	Cost of Electrode	Quality remarks
Butt	All usual	⅜-in. or less	None	Low	Low	Good quality. Up to ¾-in., use submerged arc
Vee butt	All usual	Heavier than plain butt	Single vee	Higher than plain butt	Higher	Warping must be considered
Double-vee butt	All usual	Heavier than single vee	Double vee	Higher than vee butt	Half of single vee	Warping is reduced
Single-U butt	All usual	Replaces double-vee on ½ & ¾-in. stock	One edge	Higher than double vee	Lower than single vee	Warping must be considered
Double-U butt	All usual	1 in. & up	Both edges	Higher than Single U	Lower than single U	Warping is reduced
Plain Tee	Longitudinal shear	To ⅜-in.	None	None	Highest of tee joints	Quality is uncertain for impact & transverse loads
Single-bevel tee	Heavier than plain tee	½-in. or less	One side	Higher than plain tee	Lower than plain tee	Better stress distribution than plain tee
Double-bevel tee	Heavy	½-in. & up	Two bevels	Higher than single bevel	Lower than single bevel	Best quality of all plain tee joints
Single-J tee	Severe	1 in. & up	One side	Costly	Low	Advisable to put finish weld on opposite side
Double-J tee	Extra severe, all types.	1½-in. & up	Both sides	Costly	Less than single J	Best quality
Single-fillet lap	Light to medium	Any size	None	None	Moderate	Fatigue or impact loads require study
Double-fillet lap	Severe	Any size	None	None	Higher than single fillet	Good for all average loads; not so good as butt welds
Flush corner	Light to medium	12 gage or lighter	None	None	Average	If used on heavier plate, check excessive loading
Half open	Light to medium	12 gage or lighter	None	None	Slightly higher than flush corner	Not for impact or fatigue stresses
Full open	Severe	12 gage & up	None	None	Highest	Best quality
Edge	Light	¼-in. or less	(Bend)	Low	Moderate	Not usually used for impact or fatigue loads

Comparator Specimens Assure Good Finishes

By JOHN W. SAWYER
Bureau of Ships
Navy Department
Washington

POOR SURFACE finishes on machined parts can seriously impair their life and performance. A fine surface finish is costly to produce.

Design engineers need a standard to guide them, both from the standpoint of product performance and cost. Such a standard is the roughness comparator specimen.

Good Results—Depending on the finish or permissible variations from a specified value, instruments or comparator specimens may be used with satisfactory results. Specimens are proving valuable in production; they are easy to use, compact, inexpensive and their accuracy has been exceedingly good.

Comparison microscopes using standard specimens are satisfactory for many applications. However, tactual and visual inspection can be made adequately with specimens that have been produced as desired standards.

Which Method — Both methods are in wide use. Tactual comparison is preferred. Visual comparisons can be misleading. A machined metal surface may be shiny, while a lapped surface of the same material can be dull. The machined surface may have a roughness of 125 microinches. The dull one may measure 8 microinches.

A number of surface roughness comparator specimens are available. They vary in size from a pocket slide rule form to box-like units that are best suited for bench use. The methods of manufacture include machining, electroforming and plastic impressions.

Here are some of the roughness comparator specimens made in the U. S.:

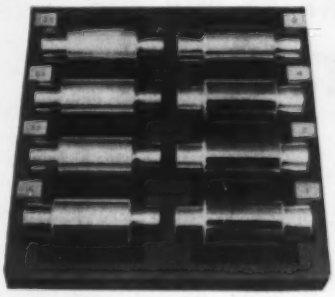
Pocket Set—Two sets of surface finish standards are made by the University Machine Corp. (and distributed by Edward Blake Co., West Newton, Mass.).

Specimens in both sets are machined from stainless steel. The pocket set consists of 20 specimens, ranging from 2 to 500 microinches, which fit into a magnesium-alloy case. Each specimen is identified with its roughness value and type machining operation used in its production.

The master set of 23 specimens varies in roughness from 2 to 500 microinches. Specimens follow the preferred number series. Each is removable from the felt-lined case, which measures 8 x 10 in.

These two surface scales made by General Electric Co. illustrate the pocket-rule specimen

This set of 23 specimens made by University Machine Co. is best suited for bench use



Norton Co. makes a set of specimen cylinders for grading cylindrically ground surfaces

Plug Form—Roughness comparison specimens are made in round plug form, 1 x 1 in., and in rectangular blocks, 1 x 1½ x 1 in., by Acme Industrial Co., Chicago.

Specimens are individually machined and packed in boxes containing three, five and eight items. They are marked with the microinch value they represent. They can be assembled on mandrels in various groups as required by the work in progress.

Cylindrical Comparison—General Electric Co. manufactures four sets of specimens. Two surface scales are used to compare roughness of cylindrical surfaces. Each scale is 6 in. wide and 2 in. long.

One scale is suited for tactual determination of ten surfaces, such as those produced by grinding, lapping, honing or superfinishing in 4, 8, 16, 32 and 63 microinch ranges. The other scale illustrates surfaces produced by lathe and screw machine operations in values of 16, 32, 63 and 250 microinches.

Another set, which can be carried in your pocket, contains ten roughness scales, with a total of 24 surfaces varying from a superfinished to a gas-cut or sand-cast surface.

A larger set of specimens includes ten metal blocks, 2 x 2½ in., fitted into a carrying case. An identifying number is on each block to show its degree of roughness. A number of the blocks are divided into two or four surfaces to illustrate surfaces of the same degree of roughness that have been produced by different methods.

General Electric sets are produced by electroforming and electrotyping. Each set starts from an accurately machined master; replicas are produced by one of the two processes.

Electroforms—Baptist Machine Co., Stamford, Conn., makes a surface roughness scale that can be carried in a coat pocket. It is known as the S22 Microfinish Comparator. There are 22 individual surfaces, ranging in roughness from 2 to 500 microinches.

Specimens are first machined from stainless steel to specified finishes. These are the masters from which nickel electroforms are made. The nickel electroforms, which are negatives of the masters, serve as production patterns on which the S22 comparator is electroformed.

Calibration Specimens—The F. A. Ringler Co., New York, makes precision reference specimens for calibration of instruments measuring average surface roughness. These specimens, which are electroformed, are known as Cali-Blocks.

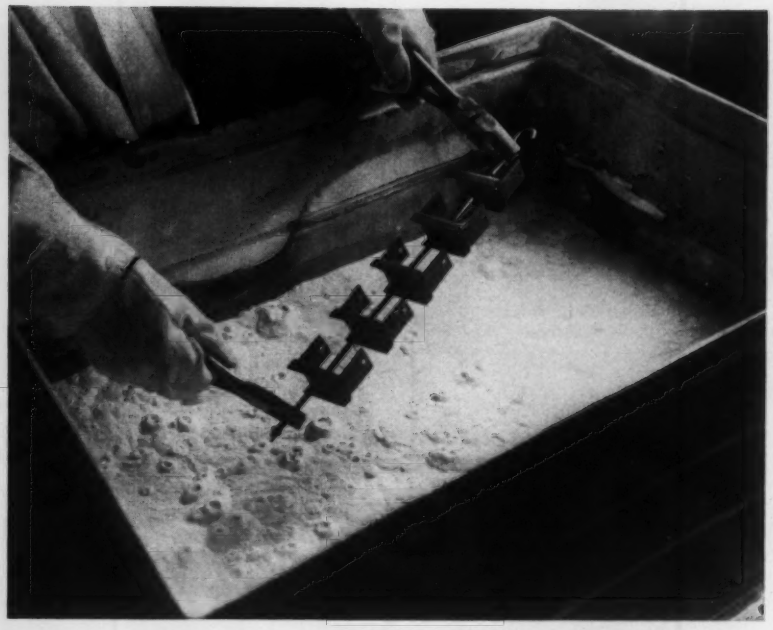
They are produced to a given geometric pattern. A cross section of a profile would be a series of planes inclined to each other at an angle of 150 degrees.

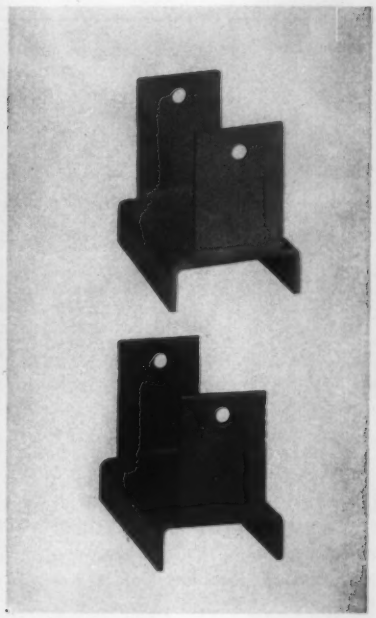
The specimens cannot be used for tactual or visual inspections. They do not have the appearance or feel common to machined surfaces.

Plastic Set — Surface Checking Gage Co., Hollywood, Calif., makes a 5 x 7-in. surface checking gage. It has 24, accurate, replica, roughness-standard comparison specimens. Specimens are formed from master surfaces in a hard, black molded-plastic. Range: From 4 to 500 microinches.

Ground Surfaces—A convenient means of grading cylindrically ground surfaces is provided in a set of finish standards manufactured by Norton Co., Worcester, Mass.

The set is composed of eight specimen cylinders with the following finishes: 1, 2, 4, 8, 16, 32, 63 and 125. Each specimen has the Profilometer reading stamped on the end.





Curtain slides must be strong and wear resistant without lubrication. Five slides (above) are about to be dipped in fluid nylon. Slides (right) before and after coating

Plastic Overcoats for Metal

A GERMAN process called Whirlclad makes the marriage of metals to plastics commonplace. The strength of metal can be combined with the natural advantages of nylon, polystyrene, cellulose acetate, butyrate, acrylic and epoxy resins. Ceramics, glass and wood can be substituted for the metal.

Advantages — Preliminary experience in this country has been largely with nylon and low-pressure polyethylene. A nylon coating provides additional wear and scuff resistance, along with low friction where normal lubrication is impossible. Nylon also resists solvents and alkalies, inhibits rust and corrosion and provides excellent high-voltage, low-frequency insulation.

Polyethylene resists corrosion and chemicals and has the additional virtue of good electrical insulating properties for both low and high frequencies. It has a surface that is soft and resilient, yet tough and scratch resistant.

Chlorinated polymers with properties similar to the fluorocarbons appear to lend themselves well to the process. Mechanical and wear properties are exceptional; chemical resistance is high, with zero water absorption.

Plastic coatings on metal parts give finished parts a dimensional stability impossible in all-plastic items. One possible application is on parts too large to make from solid plastic materials.

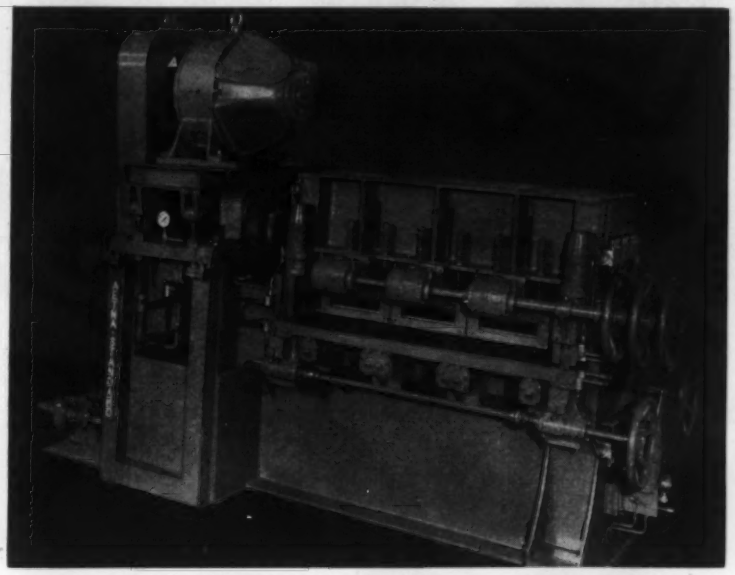
Equipment—The dipping method requires relatively inexpensive machinery. A simple melting pot with proper temperature controls holds the melted plastic. The article to be coated is roughed by blasting with angular shot, preheated and dipped. Much heavier coatings are possible than is customary with solvent coating methods. Coating thicknesses for nylon and chlorinated polymers range from 0.008 to 0.040-in. Where close skin tolerances are necessary, they are machined to the correct dimensions after dipping.

Some Applications—The earliest uses for plastic coatings have been wear parts, such as jigs and fixtures, rollers, bushings, loading hooks, sliding surfaces and corrosion parts like household appliance racks, plating hooks, valve bodies, fans, ducts and small containers.

One application that might be considered is the nylon roller which is used in hundreds of applications, from automobiles to drapery rods. One manufacturer likes nylon rollers for a part of the window raising mechanism—adding a steel core will be an improvement.

Production—The process is being operated under a licensing program by Polymer Processes Inc., with a continuous system for volume coating. Knapsack-Griesheim A.G. of Frankfurt-am-Main is the inventor. It calls its process whirlsintering.

BEARING TIPS by McGill



138 GUIDEROL® BEARINGS BACK UP WORK ROLLS IN AETNA STANDARD LEVELER

High load capacity vital to back-up roll support

For processing 16 to 30 gauge steel sheets and coils, this Roller Leveler built by Aetna Standard Engineering Company requires dependable components to deliver a consistent maximum output at speeds up to 400 feet a minute.

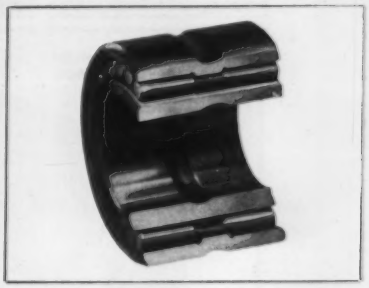
McGill GUIDEROL GR-16 bearings were selected for this machine and several larger versions use GR-24 and GR-36 bearings. They can carry the heavy irregular loads associated with flattening and leveling steel sheets and strips. Requiring less radial space, Guiderol bearings provide maximum roll neck diameters and offer greater strength at the necks of larger back-up rollers.

On the machine shown above, there is a total of 36 back-up rollers in 3 upper banks and 33 in 3 lower banks to resist the heavy pressure of the 48 inch working rolls. With a GUIDEROL bearing at each end of the 1¾" back-up rolls, a total of 138 bearings is required for the Leveler. These bearings have proved especially suited to supporting heavy loads longer in small radial space with reduced maintenance and production down time — important in steel mill operations.

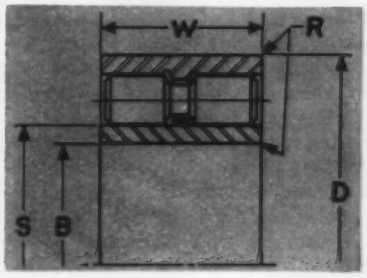
American Hoist Uses CT Series In Crane Blocks

Crane Blocks built by American Hoist and Derrick to withstand the greater strains and rough usage of lifts up to 500 tons rely on the greater capacity of GUIDEROL CT Series bearings in the sheaves. Interchangeable with retainer type cylindrical roller bearings, the CT Series full type roller construction has added capacity of over 38%. In sheaves these bearings offer greater angular stability with full race width rollers. Center guiding without retainer keeps these rollers aligned and prevents binding under eccentric loads.

Center-Guided Rollers Eliminate Load Wasting Cages



Guiderol Bearings inherently possess exceptionally high radial load capacity due to their full complement of small diameter rollers. Grooved rollers and a center guide rail keep rollers aligned as insurance against skewing and binding that is possible with ordinary needle bearings. Sizes interchange with needle and cylindrical roller bearings.



CT Series Adds Guided Roller Advantages to Cylindrical Roller and Ball Bearing Sizes

CT Series Guiderol Bearings provide the load carrying advantages of center guided rollers in cylindrical roller and ball bearing sizes. They are interchangeable in both single and double row dimensions. Inner rings are separable and may be eliminated to reduce radial space.

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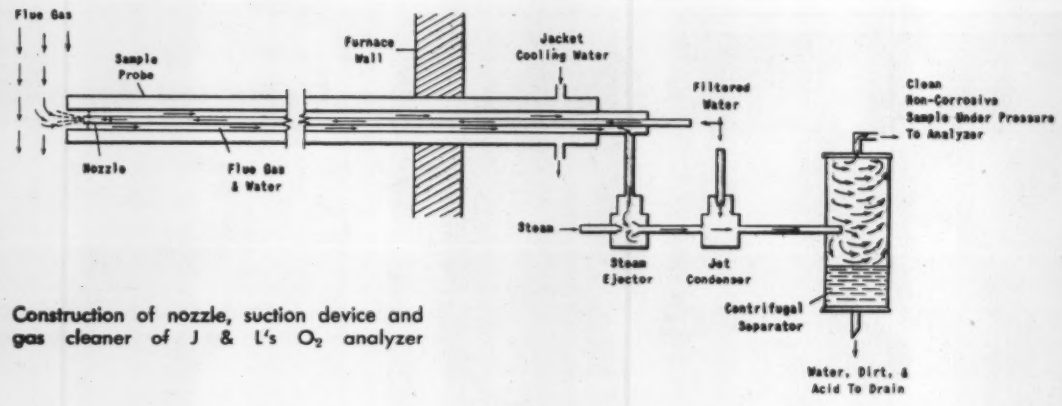
McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA



Construction of nozzle, suction device and gas cleaner of J & L's O_2 analyzer

Oxygen Sampler Guards Open-Hearth Efficiency

A SAMPLING SYSTEM for measuring oxygen content in open-hearth flue gases has been installed at Jones & Laughlin Steel Corp., Pittsburgh. Tied in with a recorder-controller, the system adjusts the fuel-air ratio automatically for optimum combustion efficiency.

Designed by Leeds & Northrup Co. for use with their magnetic-type oxygen analyzer, the system obtains a continuous, dirt-free sample with a minimum of maintenance. Reliable measurement of O_2 content as an index of furnace performance offers the promise of faster heats and increased steel production from the open hearth.

In Down-Take—In a typical analyzer system for an open-hearth furnace, sampling tubes are installed in each down-take and connected by ¼-in. OD copper tubing to the analyzer. The analyzer and its recorder or recorder-controller can be located up to 200 ft from the sampling point, with as little as 5 seconds lag in the sampling time.

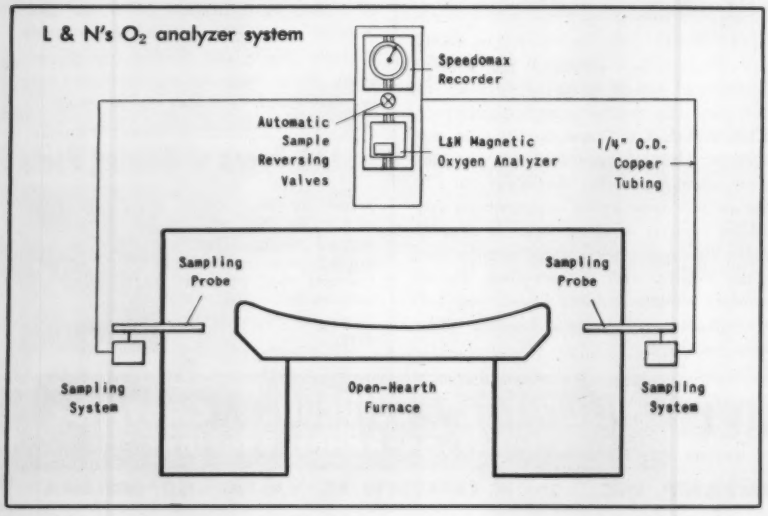
The L&N-engineered sampling system includes a water-jacketed probe, a steam ejector, a jet condenser and a centrifugal separator. Each has a key role in providing a dirt-free sample and continuous, trouble-free operation.

Water Washed — The sample probe has an outer jacket through which water continuously circulates to cool the tube against the effects of the high-temperature flue gas. In the center of the probe a tube carries filtered water to a nozzle assembly which washes the probe opening with jets of water. These jets keep the end free of slag. Small radial sprays from the nozzle flush the sample passage to prevent accumulation of dirt.

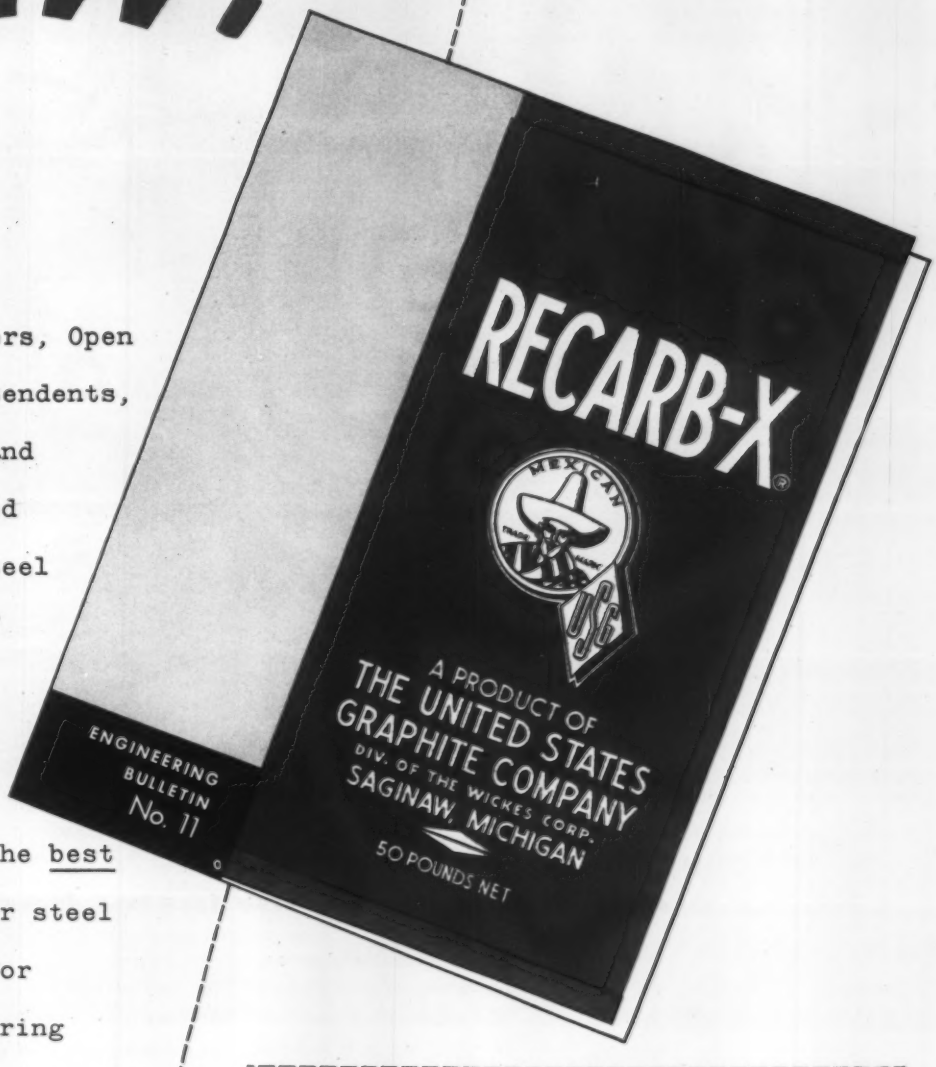
The mixture of flue gas sample and wash water is drawn from the probe by the suction of a steam ejector. Steam thoroughly mixes with the gas and dirt, and the mixture passes to a jet condenser. In the condenser, a water jet causes the steam to condense, wetting the dirt particles thoroughly, so that they can be removed in the centrifugal separator. Condensation also removes corrosive gases.

Spun Clean—Water and wetted dust are spun to the outer periphery of the separator and then flow to the bottom. The clean gas sample leaves the top of the separator under positive pressure which delivers it to the analyzer at high velocity and eliminates chances of sample contamination due to leaks in the piping. The scrubbed, acid-free sample assures

L & N's O_2 analyzer system



NEW!



a memo to Melters, Open Hearth Superintendents, Metallurgists and others concerned with quality steel making . . . If you haven't tried RECARB-X and want the full facts on the best recarburizer for steel making, write for the new Engineering Bulletin No. 11, use the convenient coupon below.

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ACME STEEL STRAPPING ACME STEEL

minimum system maintenance by eliminating plugging or corrosion of the sample line.

The two gas sample lines are connected to a reversing valve at the analyzer-recorder panel. It operates automatically during furnace reversals to connect the exhaust down-take side to the analyzer.

At the same time, the sample from the opposite furnace end is vented to atmosphere. Except for the brief period after reversal (before furnace conditions have stabilized to the point of producing a significant O_2 measurement) the system provides continuous oxygen analysis, regardless of the frequency of reversals.

Measurement — The gas sample from the automatic reversing valve enters the analyzer through a separator where any condensate is removed. It then passes through a filter and rotameter assembly which maintains a constant rate of flow to the analyzer cells.

In the analyzer, the oxygen content of the sample is measured by the paramagnetic properties of oxygen (it is strongly attracted to a magnetic field). With an electrical circuit designed to minimize errors due to changes in gas pressure, the analyzer produces a signal directly proportional to the O_2 content of the gas. This signal is measured by an L&N electronic recorder calibrated directly in per cent of oxygen (normally 0 to 10 per cent O_2 for open-hearth flue gas).

The panel board: Oxygen analyzer above and recorder-controller below

Cutting efficiency takes a jump with . . .

TV Eyes for the Slab Shear

CLOSED-CIRCUIT television has eliminated waste and increased efficiency at Great Lakes Steel Corp.'s No. 3 Slabbing Mill in Detroit. It solves a problem common to steel mill production: Obtaining maximum cut lengths when shearing red-hot slabs.

Shearmen have an important cut to make in hot steel slabs coming down the line. They must know how long the slabs are to make two cuts of maximum length—16 ft 6 in.

Guesswork—A scale in front of the shearman shows him how long his first cut will be. But even by using an elaborate set of mirrors, he was never sure of the length of the entire slab, and had no positive way to get maximum length from his last cut.

The problem was solved when a closed-circuit TV system made by Dage Television Division, Thompson Products Inc., Michigan City, Ind., was installed in the mill. Cost: Less than $2200.

Extra Eyes — The system consists of one self-contained TV camera and one receiver. The camera is mounted 20 ft above the mill floor in a special pedestal, about 150 ft from a calibrated scale on the slab line. The camera focuses on the scale and transmits the image to the receiver, which is installed to the left of the shearman in his control booth.

When a hot slab comes down the line, the shearman watches the slab line in front of him, and by glancing to his left sees a close-up of the scale on his TV screen. As the slab comes up to the shear, its own red-hot light illuminates the scale, making it easy for the shearman to make an accurate cut. (See inset in photo above.)

Shearmen in the mill report that the system has practically eliminated waste in cutting, making possible accuracy previously unobtainable. Their job has been made much easier. They can stay in their control booth, instead of having to get up and down frequently to inspect each slab.

Mr. Smith goes to Florida

Mr. Smith's books showed an excellent current ratio. His cash position was good; his surplus was substantial. Shortly thereafter, however, he entered a premature retirement.

He had overlooked the fact that a large part of his company's fixed assets were machine tools, and their values shown on his balance sheet were simply bookkeeping entries. Those values didn't reflect obsolescence, nor show how expensive indirect labor, nonproductive floor space and downtime can be.

A closer look at your balance sheet may reveal the wisdom of investing in new production equipment. Its high rate of return makes good balance sheets better.

The 14-station machine has Line-O-Dex indexing, automatic hydraulic clamping and positioning, and drills ¼" holes with Aveydraulic Torquematic deep hole drilling units.

When this order is complete, or the part changes in design, the Avey standard units can be rearranged for a new job ▶*an economical way to extend the life of your investment.*

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

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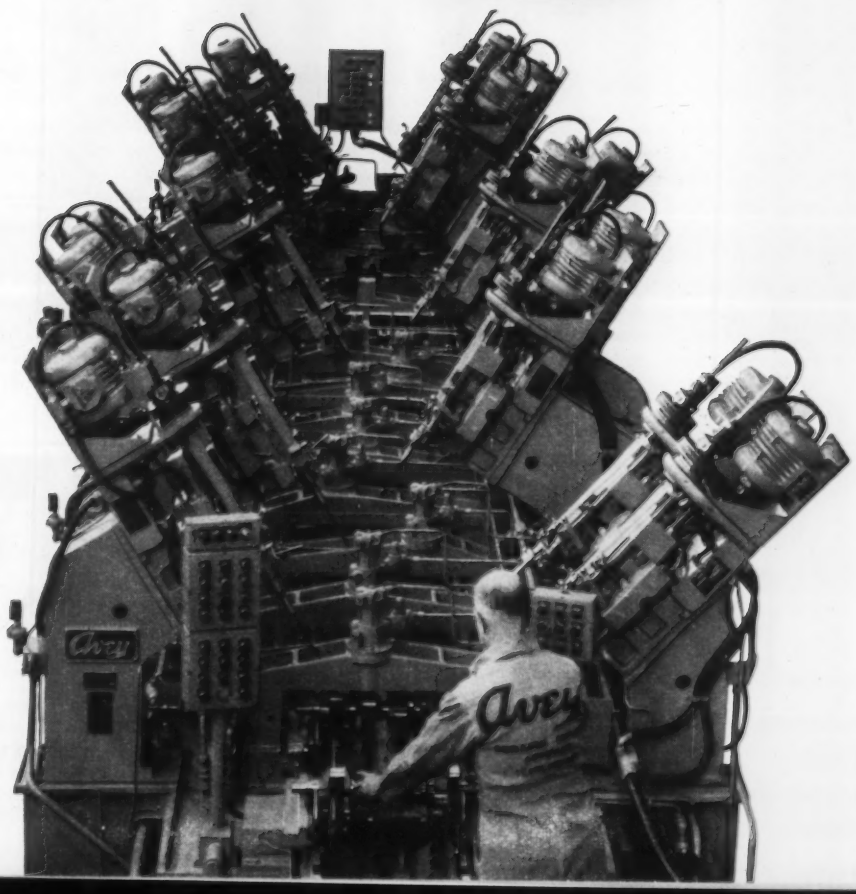
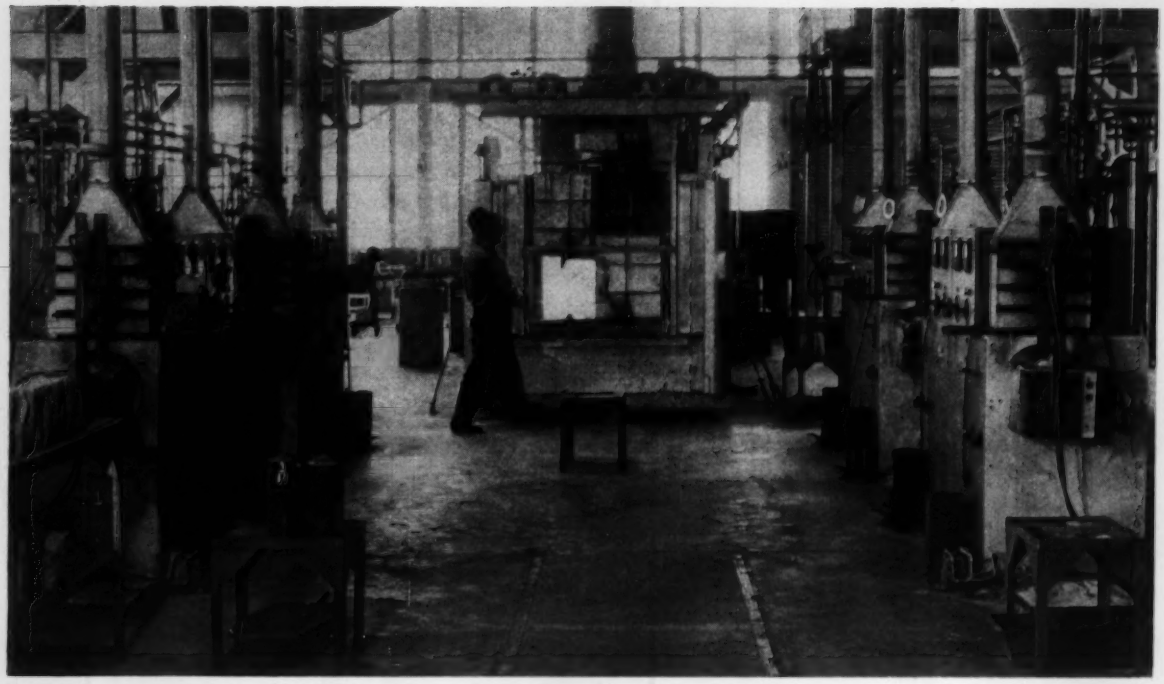




Investment casters eye future production of gas turbines for autos. This foundry, complete with remelt and mold preheat furnaces, was planned with turbines in mind

Investment Casters Bid for New Role

TOMORROW'S star for automobile gas turbines may be an old timer: Investment casting.

Nickel-base investment castings for turbine blades last 2½-times longer than forgings, it was revealed at a recent meeting of the Investment Casting Institute.

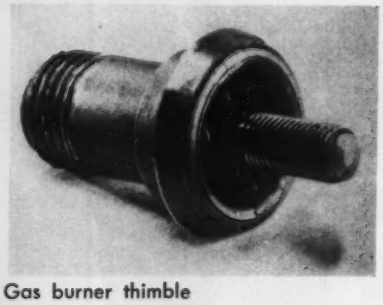
Hot Strength — While forgings are used in many turbine applications, investment cast parts give better results in the hottest and most critical end, according to GM's Dean Hanink of the Allison Division. Casting gets the most hot strength out of both austenitics and superalloys. That's logical because the higher the hot strength, the lower the forgeability.

Solves Tough Problems—Investment casting is an inexpensive way to make accurate parts in large quantities. Sometimes, it's the only answer to tough production problems.

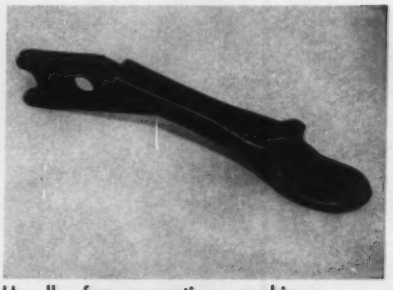
One radiant gas burner maker had trouble making burner thimbles out of sand castings. So many blowholes and other defects were exposed during machining that a large share ended up in the scrap barrel. In spite of increased cost, investment casting reduced the final price tag 35 per cent, and quality was improved.

An elevator builder used a complicated part that required ½-hour of milling—a maximum of

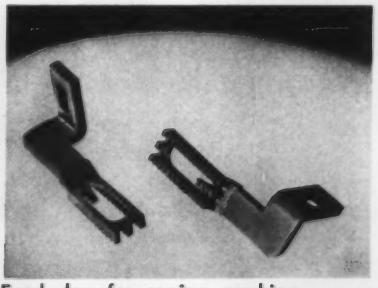
TYPICAL INVESTMENT CASTINGS



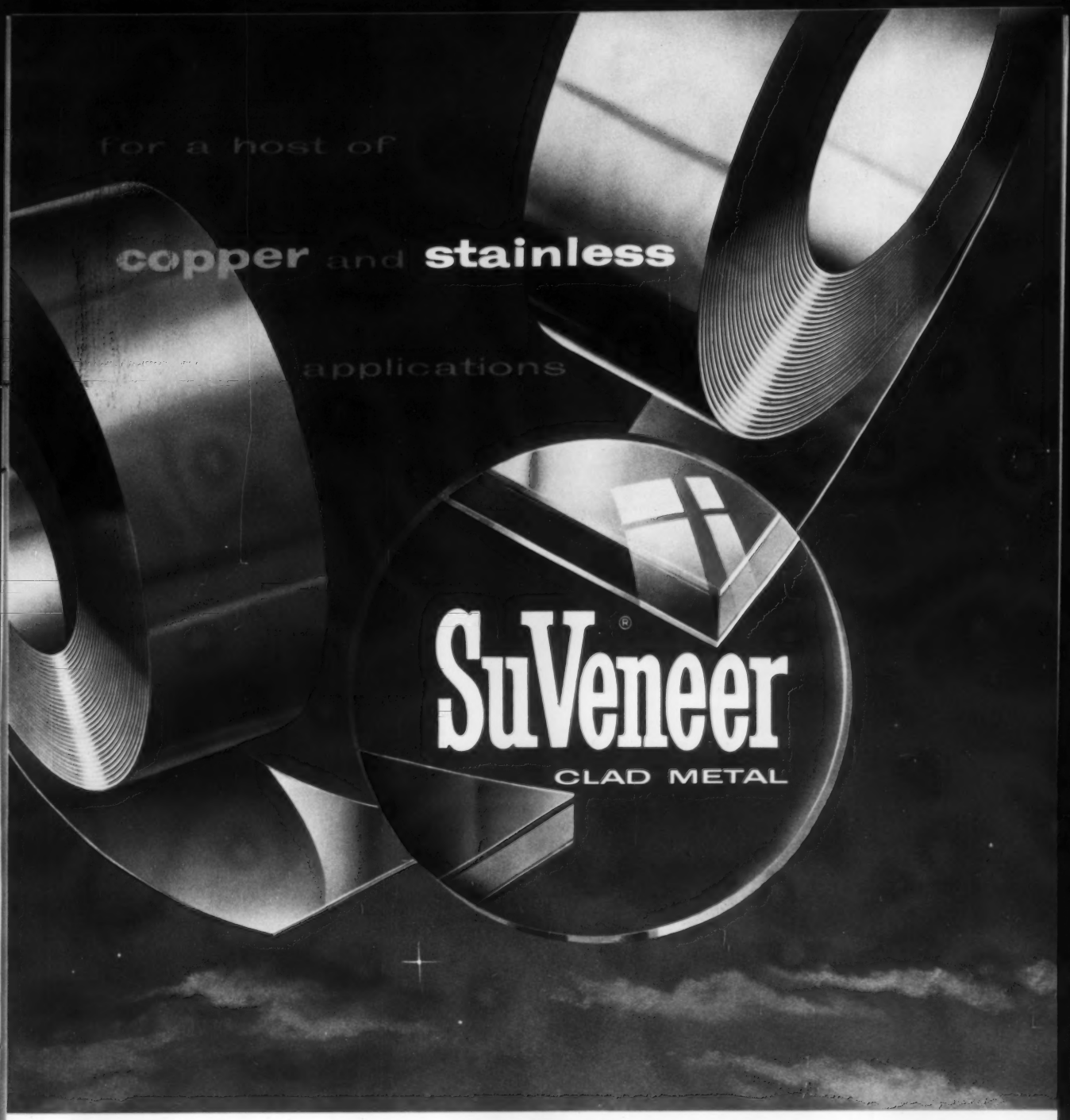
Gas burner thimble



Handle for computing machine



Feed dog for sewing machine



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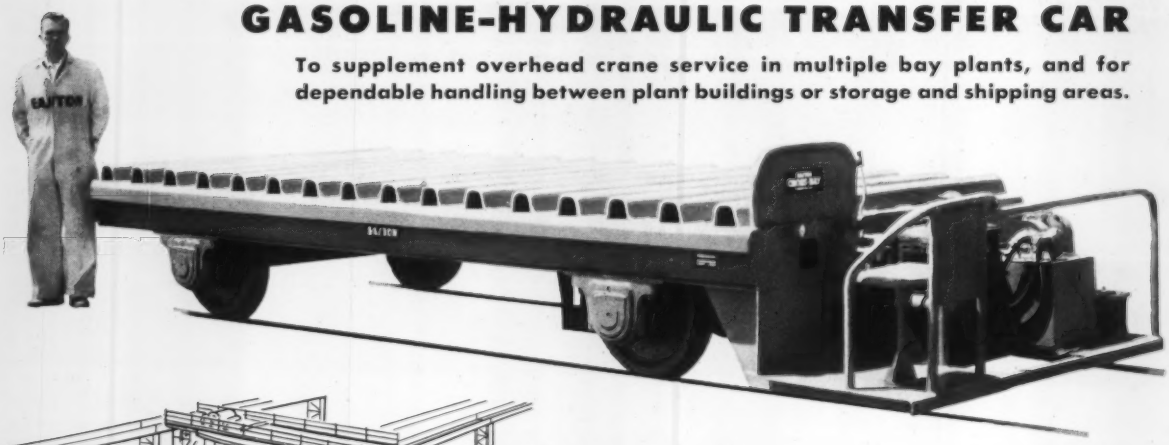
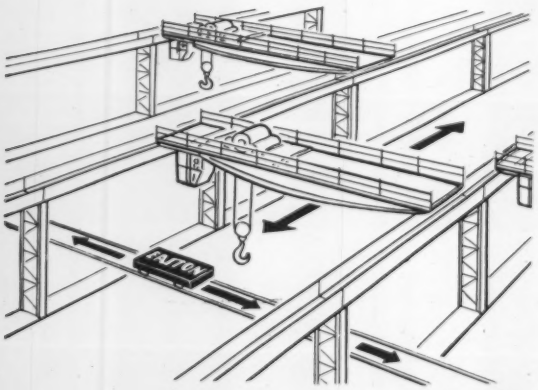
NEW CROSS-BAY®

GASOLINE-HYDRAULIC TRANSFER CAR

To supplement overhead crane service in multiple bay plants, and for dependable handling between plant buildings or storage and shipping areas.





EASTON CROSS-BAY CARS are custom-built to meet speed and capacity requirements. Special superstructures can be designed for specialized or mechanized handling. The gasoline-hydraulic Cross-Bay Car illustrated above was built for steel warehouse work. It provides a capacity of 25 tons plus 50% for impact loading, and a two-way speed of 50 feet per minute.

In addition to the gasoline-hydraulic car shown above Easton Cross-Bay Cars may be powered by electric motor, electro-fluid drive, gasoline-electric drive or storage battery. Capacities from 5 to 500 tons. Controls may be manual, electric (by push-button on the car or remote station) or electronic.

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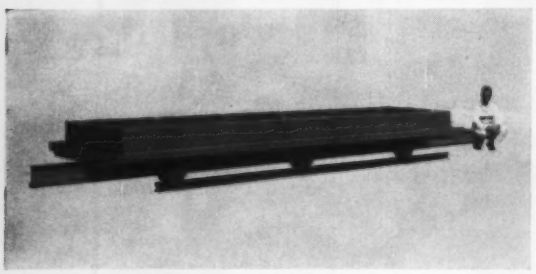
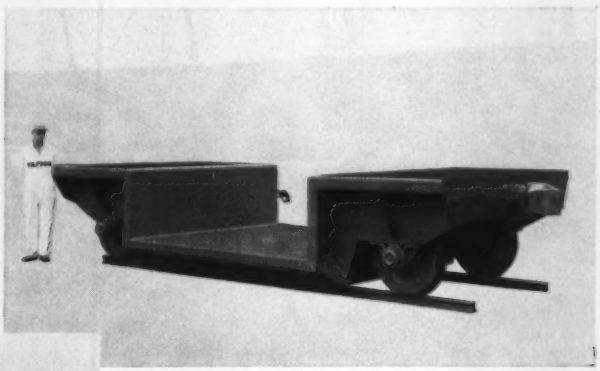
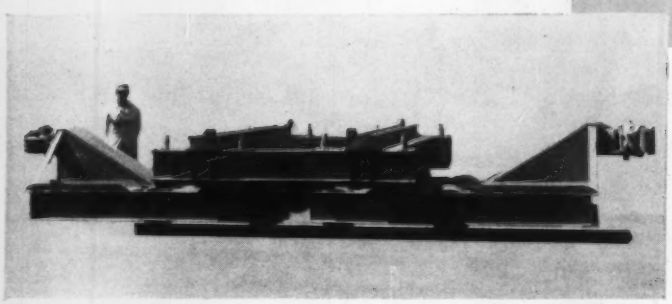


Annealing Furnace Car Equipped with Rack Beam ▲





▲ Split-level Platform Car—Capacity 50 tons

◀ Double-truck Transformer Transfer Car —Capacity 150 tons

A-1049

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

320 pieces was produced each month by each machine. He needed more production, but a milling machine costs around $9000. Doing it with investment castings cut milling time and saved 15 per cent —plus the cost of a new machine.

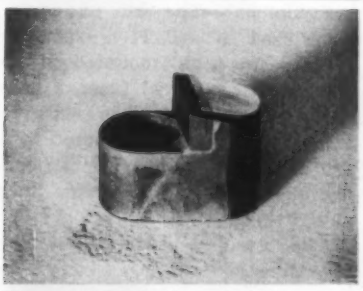
Sometimes, investment casting pays off by lightening the load on a toolroom. A major builder of sewing machines made a feed part out of sheet stock, forming and machining it through 23 operations. Die upkeep was expensive and so frequent that a duplicate set of dies was needed. Piece cost is slightly higher, but the reduced maintenance burden on the dieroom is worth the price of investment casting.

Choice of Method—Choosing between investment casting and other methods can be based on size considerations. A large aircraft turbine case used to be forged. The completed part weighed about 240 lb. Investment casting, even before refinements, cut this to 138 lb. Further efforts will reduce this to 108 lb.

Allison forged a turbine burner plate into an 80-lb finished part. Investment casting cut it to 15 lb.

Inspection—Investment castings are of high quality because a foundry today must use a great deal more inspection than formerly was thought necessary. In addition to dimensional checks, controlled etch inspection for surface imperfections, fluorescent penetrants, radiographics and chemical analysis are considered necessary.

Future—According to Mr. Hanink, automotive turbine engines will eventually make great demands on investment casting. Founders are preparing to meet the expected demand.



Sewage cutter with carbide insert

Reds Plot Machine Progress

Russian machine tool developments filter through a central agency—must get the stamp of approval

MACHINE TOOL progress behind the Iron Curtain is a planned, highly organized, highly centralized business.

Central authority for all machine tool developments is ENIMS, the Experimental Scientific Research Institute for Metal Cutting Machine Tools.

Scheduled—"Machine tools are planned three to five years ahead," reports W. H. Brandt, engineering manager, Director Systems Department, Westinghouse Electric Co.

Just back from a trip to the USSR, Dr. Brandt says ENIMS focuses its attention on three main activities: Calculations of obsolescence, rigidity of tools (machines) and general design problems.

Improve and Apply—Under general design there are three departments: Technology, metallurgical and design. The organization encompasses 50 laboratories. In addition, electric and hydraulic departments serve as consultants to all other labs. They also act as general clearing houses for technical information.

Big job of the organization is to improve machine tools and to help put these improvements in the right place in the machine tool industry.

Company Developments — Russian machine tool builders also are allowed to come up with their own designs. The catch is that all designs must be sent to, and approved by, ENIMS before the builder can go ahead.

ENIMS figures its first responsibility is to keep the industry from building new units that do not incorporate the latest improvements. When there's disagreement between ENIMS and the builder, the latter may defend his position. The Ministry of Machine Tool and Instrument Building is the final judge in the disputes.

No Competition—Dr. Brandt reports that machine tool programs are planned on a five-year basis. Each department in ENIMS has a list of projects covering the period that's approved by the builders. Builders are permitted to make suggestions. They may or may not be incorporated. ENIMS also coordinates planning in the plants to avoid "duplication" and to provide mutual assistance.

The 10 and 15-year plans are less specific than the short ones. In current long-range plans, they are talking about further use of completely automatic production lines. Dr. Brandt points out that the Russian definition of "automatic production lines" is nothing more than a so-called transfer machine.

Other current machine tool programs in the USSR: Chip control, gear cutting, gear grinding, and electroerosion. About the last, he says: "They seem not to have used electroerosion (at an experimental plant) . . . for working carbide or for drilling irregulary shaped holes, but they knew that this could be done."

Random Observations — Dr. Brandt noted that: "Product per man-hour is substantially below American standards. Automation from the standpoint of the good of the worker . . . is a favorite theme . . . but the actual evidence in the factories does not indicate as much concern with worker fatigue and with working conditions as does the conversation."

One plant has an assembly line for making lathes with a stated capacity of 54 a day. It maintains an extensive laboratory with 50 or more machines used entirely for experimental purposes. They were experimenting with ceramic tools, operating them at 900 meters per minute and obtaining an 80 microinch finish.

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Is your present abrasive tough enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned.* Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test—put muscle behind *your* blast cleaning with Malleabrasive! *We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.*

NOW — IN EASY TO HANDLE 50 POUND DOUBLE BURLAP BAGS

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

Sold and recommended by Pangborn Corporation, Hagerstown, Md.

MALLEABRASIVE®

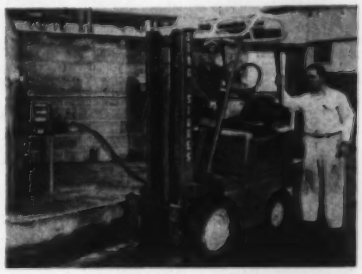
Switch to LP-Gas

A machinery manufacturer will save $4000 a year by converting his handling trucks

MATERIALS HANDLING costs in the Torrance, Calif., plant of National Supply Co. are being cut by converting 25 gasoline-powered industrial trucks to operate on liquefied petroleum gas, a mixture of butane and propane.

Tests indicate that an annual saving of more than $4000 can be expected when all the trucks are converted. In less than two years, this saving is expected to pay for the conversion of trucks that normally use 400 or more gallons of fuel a year.

Breakdown — Cost savings are made in several ways: First is a substantial reduction in fuel cost. National Supply engineers also report maintenance reduced to one-half, almost complete elimination of noxious exhaust fumes and smoother and quieter operation.



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Engine wear is reduced because there are no carbon or lead deposits; engine oil lasts longer since there is no dilution; spark plugs are not fouled; detonation is eliminated because of the high octane rating of the fuel.

Equipment—The kit of equipment used to convert a truck includes a gas tank (mounted on top of the truck), a fuel filter, a converter to reduce fuel pressure to 1½-psi and change the liquid to a dry gas, an idle and power adjusting block and the necessary lines and fittings.

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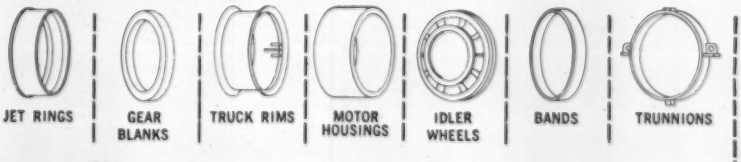

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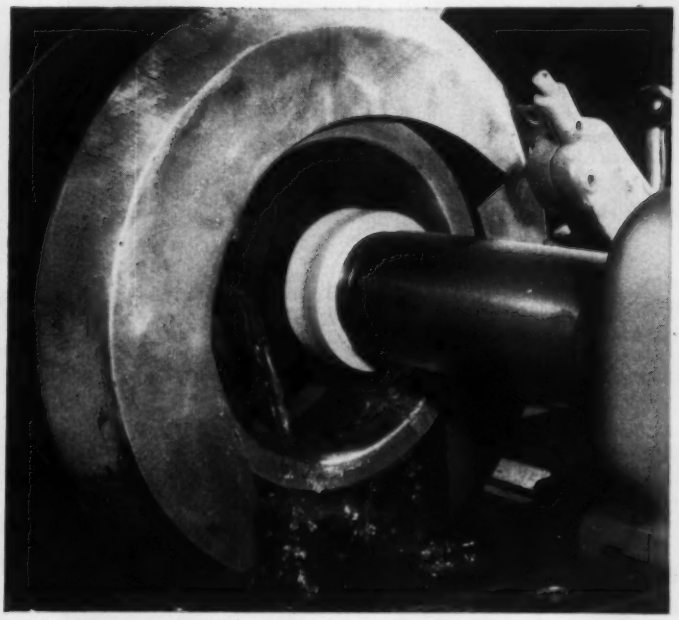

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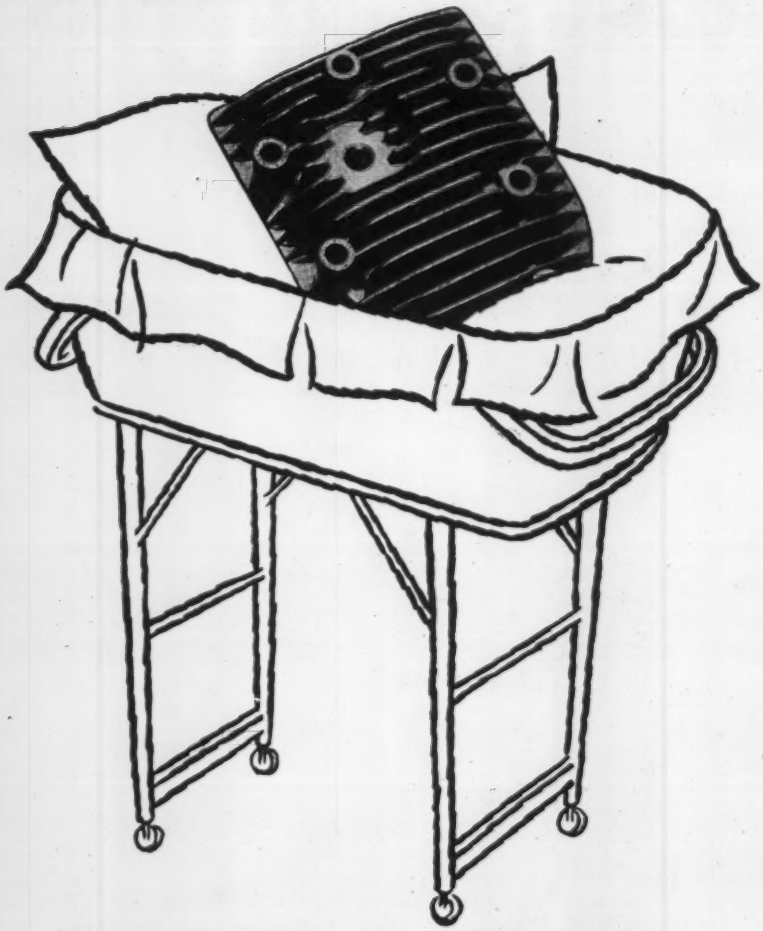

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The success of a casting is often determined long before the metal is melted and the casting poured, because no matter how carefully casting is done nor how excellent the mold, a quality part cannot result unless quality metal is used.

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Whatever you need in non-ferrous ingot metal, or in technical service to assure good non-ferrous castings, think of Federated first as your source of supply and technical information. Our broad experience with all kinds of non-ferrous metals has earned us our reputation as Headquarters for Non-Ferrous Metals.

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Better Aluminum

Adding titanium to aluminum helps sand casters improve their product, cut scrap

TITANIUM improves aluminum sand castings. Called a hardener, it is added to a melt in the form of a 5-per-cent, titanium-aluminum alloy.

In addition to increased tensile strength, ductility is improved by the added titanium. Castability improves and prevents pin holes and hot tearing. Decreased porosity makes castings pressure resistant, leakproof and improves machining and polishing. Foundry experience indicates that hot cracking is eliminated.

COMPRESSOR PISTON
. . . titanium made it stronger

Maker — Titanium-aluminum alloy as furnished contains 60-per-cent titanium. It is made by Shieldalloy Corp., New York. Secondary aluminum smelters and intermediate alloy producers convert the alloy to the 5-per-cent intermediate called Shieldalloy.

The 5-per-cent titanium alloy is used because it dissolves more readily in molten aluminum and avoids the need for overheating. One benefit from this practice is a smaller grain size that improves ductility and increases tensile strength 10 to 25 per cent.

In practice, the titanium is added to base aluminum alloy to obtain 0.15 to 0.20 per cent titanium as cast.

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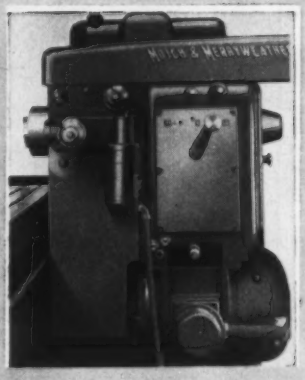

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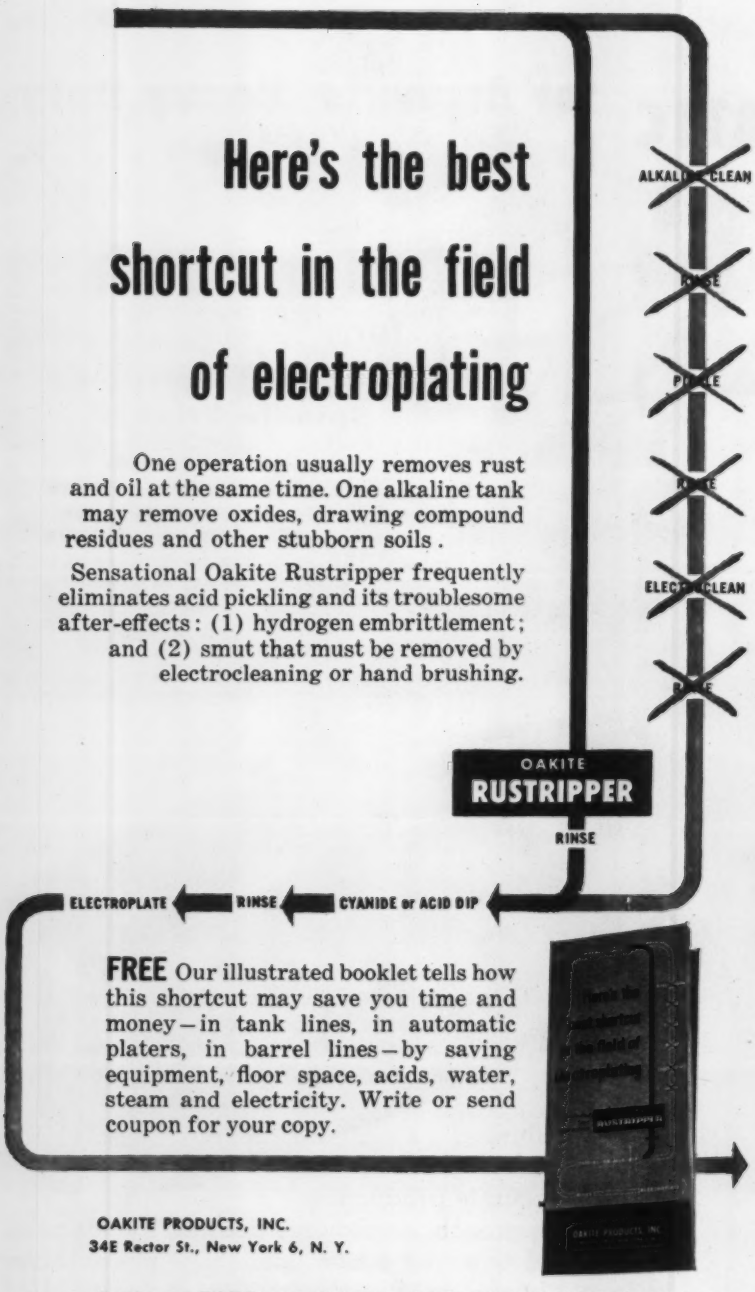

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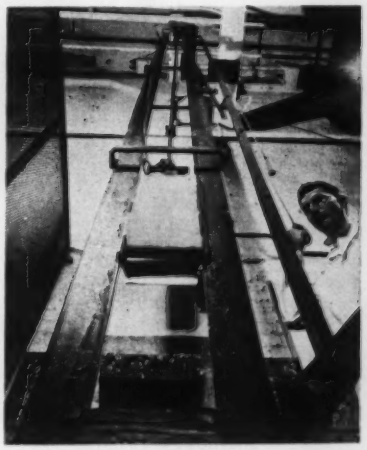
New Impact Test

A WELD BEAD, an abrasive-wheel-cut notch and a large sample (14 x 3.5 x 1 in.) are replacing the Charpy test at Westinghouse.

For testing the large samples, engineers use a standard weight in a tall guillotine. The sample is prepared by placing a weld bead on the bottom and cutting a notch into the bead with an abrasive cutting wheel. The temperature is recorded; the weight is dropped; and the results plotted on a graph.

Tests are said to be faster, less expensive and, although less exact, just as useful as the Charpy.

Charpy Test—Measuring brittleness has been done for years with the Charpy test. A pendulum is swung against the test piece, and the temperature and the amount of impact are recorded. Samples are compared by the number of foot-pounds required to break the specimen.



GUILLOTINE
. . . replaces Charpy test

Sample Preparation—Machining the test bar to the correct size and the vee notch to exactly 79 mils deep for the Charpy test is time consuming and expensive. The Westinghouse test requires less exact temperature control and measurement. If one piece fractures at −20° F and the next one does not at +20° F, the sample has been defined adequately. Sample preparation time has been cut one-third.

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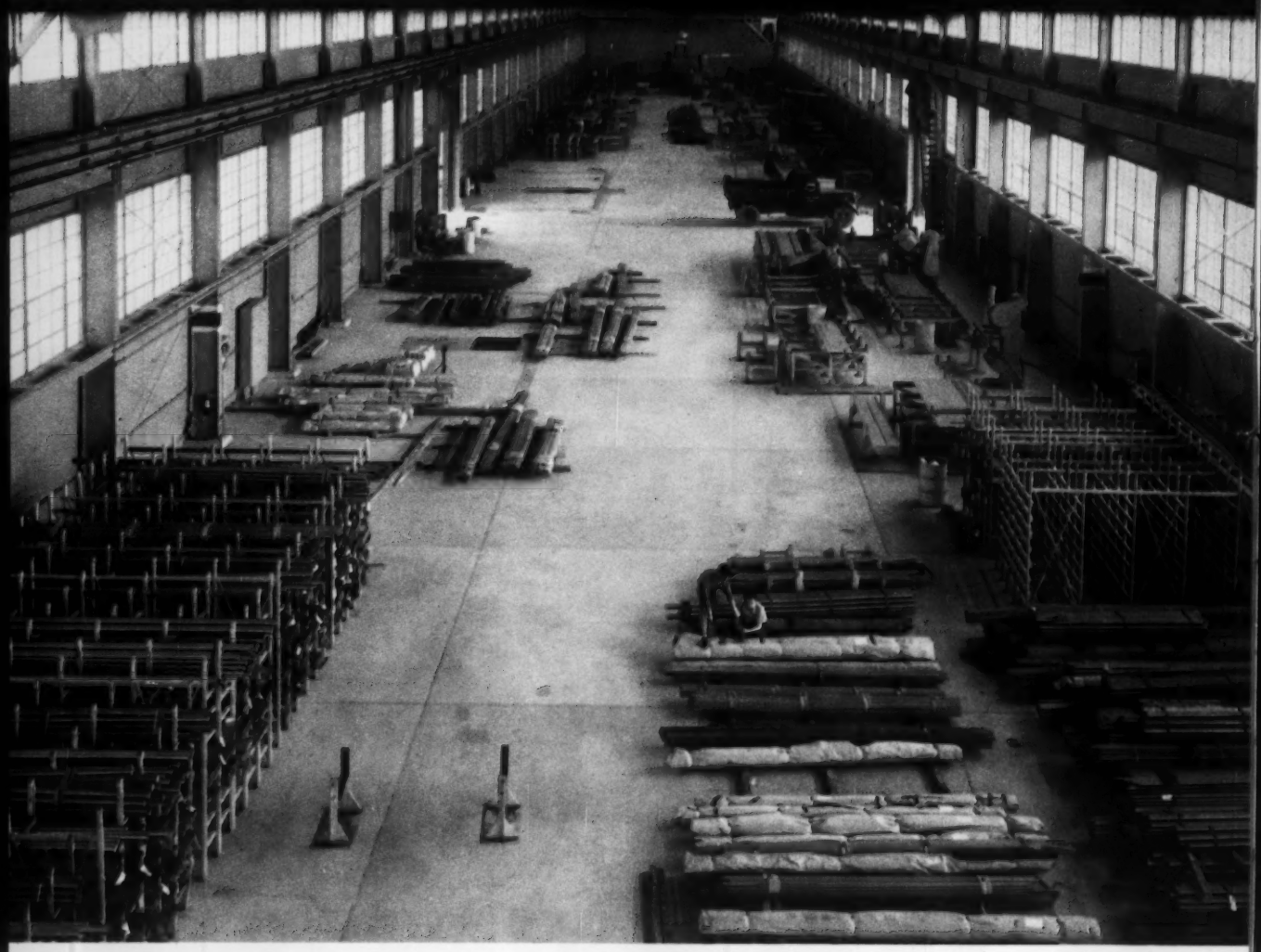

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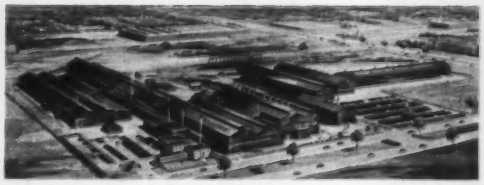

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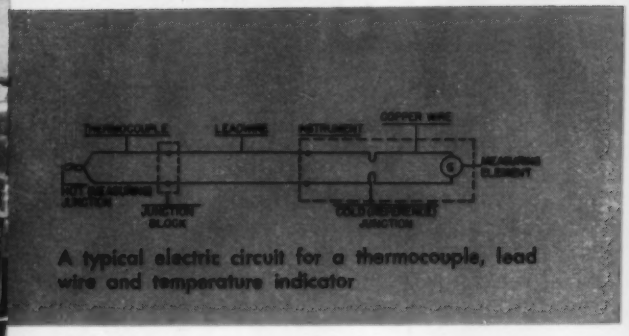
Like any equipment, a thermocouple deteriorates with age. Calibration with a potentiometer, like this man is doing, is an important part of correct maintenance

TEMPERATURE CONTROL
OF HEAT TREATING FURNACES

PART TWO

By R. M. Sills
General Electric Co.
Schenectady, N. Y.



A typical electric circuit for a thermocouple, lead wire and temperature indicator

Thermocouples

THE THERMOCOUPLE is the most common and versatile temperature measuring and controlling device. It is simple, low in cost and adaptable.

Proper selection and use of thermocouples are not simple, as evidenced by the vast amount of literature on the subjects.

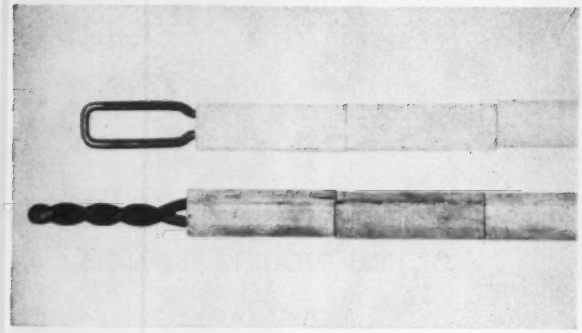
How It Works — Basically, a thermocouple is two wires joined together at one end (the hot junction) and connected at the other end to an electric measuring device. Electricity is produced when the junctions of the metals are maintained at different temperatures. If the circuit is open, a voltage or electromotive force (emf) is produced; in a closed circuit, current flows.

If one junction is maintained at a fixed temperature, the emf will have, for any two given metals, a fixed relation to the temperature of the other junction. Such a combination is known as a thermocouple or, more familiarly, a "couple."

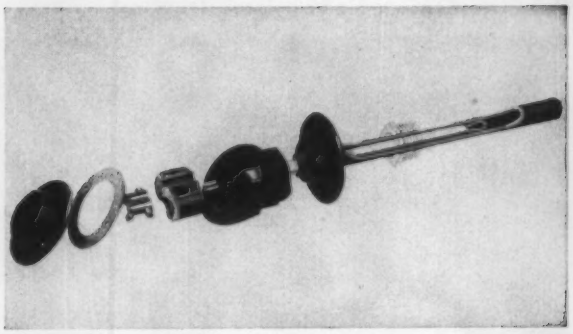
The emf and current produced by thermocouples is approximately a linear function of the temperature difference between the hot and the cold junction. Calibration tables are based on a cold junction temperature of 32° F. For laboratory work, cold junctions are often placed in a thermos bottle of ice water. Ordinary temperature instruments use room temperature for the cold junction, with a compensating resistor or other means provided for calibration.

In a typical thermocouple, the two wires are insulated from each other by porcelain beads. A junction block is provided for the thermocouple and the extension lead wire which connects it to the temperature measuring instrument. A head, usually a diecasting, protects and encloses the junction block and holds the thermocouple.

Protection—Although open ther-



The business end of a thermocouple. The top one is butt-welded; the do-it-yourself style is shown below



An exploded, cutaway view of a thermocouple and totally enclosed well. Note the double-bore, ceramic insulator

mocouples are used in today's furnaces, it is more common to enclose them for protection from gases, liquids and mechanical damage. It also serves to support the thermocouple and simplify installation in pressure or liquid vessels.

Thermocouple location is important. These points should be considered:

A. The thermocouple must be affected only by the heating unit it controls. It should not be placed between two furnace zones, except for overtemperature protection.

B. It should be inserted into the furnace far enough to prevent cooling by conduction but not so far that it droops. Its calibration must not be affected by a temperature gradient throughout its length in the furnace.

Horizontally mounted thermocouples in well insulated furnaces are inserted beyond the inside brickwork four to six times their outside diameter. For other applications, immersion up to ten times the diameter may be required. Once installed, the depth of immersion should not be changed.

C. The thermocouple should not be close to a heating element. Similarly, in open-fired gas or oil furnaces, the thermocouple should be protected from the direct contact with the flames.

D. Thermocouples in protective atmospheres or products of combustion should not allow hot gases to escape past the connection block. Escaping gases not only heat up the connections to the lead wire, causing temperature errors, but fill the conduits with gases which may be explosive. The head should be screwed to a pipe nipple welded to the furnace casing or otherwise sealed against loss of furnace atmosphere.

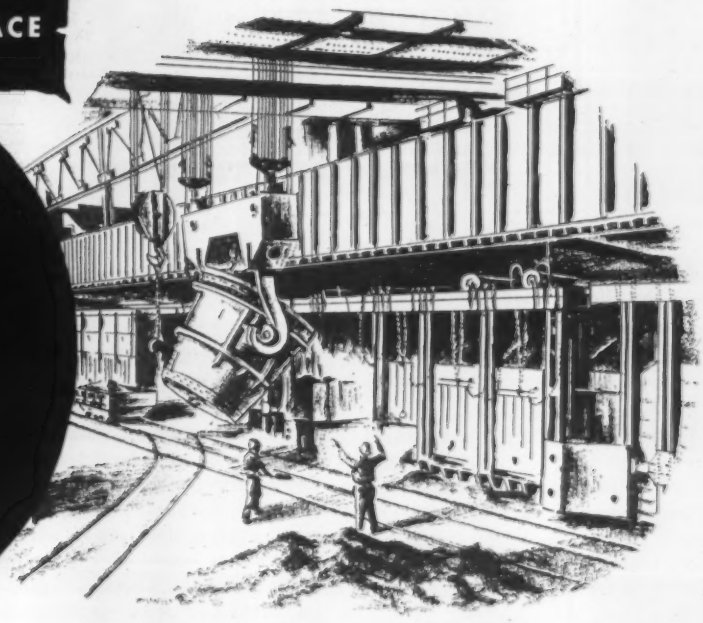
E. Lead wires should be connected to the correct poles. They are color coded. If the instrument reads in the wrong direction, re-

The Four Basic Thermocouple Types

TYPE	USES	TEMP. RANGE (°F)	ELEMENT PROTECTION	REMARKS
Iron-constantan	Low temperatures; air drawing; copper or brass annealing; ovens	300 to 1400	Normally unprotected	Above 1000°F, greatest enemy—oxidation. Reducing atmospheres can cause carburization errors
Chromel-alumel	Copper annealing; wire enameling; air atmosphere; medium temperature heat treating	0 to 2100	Only with sulphurous or reducing atmospheres	Resists oxidation. Do not use in hydrogen-containing atmospheres over 1400°F
Nickel-nickel 18% Molybdenum	Copper brazing; heat treating steel & stainless	To 2150	Gas-tight, hermetically sealed tube	Replaces some radiation detectors unaffected by hydrogen
Platinum-Platinum Rhodium	Forging furnaces; high-temperature heat treating; laboratory work	To 2800	Full-length, double-bore insulators inside vented, double-walled tubes	Called noble-metal couples. Highest cost; lowest electromotive force. Severely attacked by hydrogen, silicon or metallic vapors

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

FATHER OF THE OPEN HEARTH FURNACE



When Karl Wilhelm Siemens designed his regenerative furnace for glass manufacturing in 1861, he saw the possibilities of his furnace in the production of steel. Siemens granted a license to Pierre and Emil Martin of Sireuill, France, and in 1864 they built what is thought to be the first successful open hearth furnace.

Around 1867, J. T. Potts, Karl Siemens' engineer was building a regenerative furnace to melt crucible steel at the Anderson, Cook and Company plant in Pittsburgh. Assisting Potts was Samuel T. Wellman, an American engineer. Wellman was sent in 1869 to the Bay State Iron Works in South Boston, Massachusetts to build the first successful open hearth completed in the United States. A furnace with five ton capacity went into operation early in 1870. The good news got around quickly. In 1871 a furnace was built in Nashua, New Hampshire, and at the Singer, Nimick & Co., in Pittsburgh.

By 1909 open hearth production surpassed that of Bessemer process, and today it accounts for approximately 91% of all the steel made in the United States.

The first producer of dead-burned dolomite is The J. E. Baker Company. Since its beginning BAKER'S MAGDOLITE offered steel producers more uniform ingots, increased furnace efficiency at lower refractory costs. BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Strength, Economy, and Quality. The next time you order dolomite, specify BAKER'S MAGDOLITE, the original dead burned dolomite.

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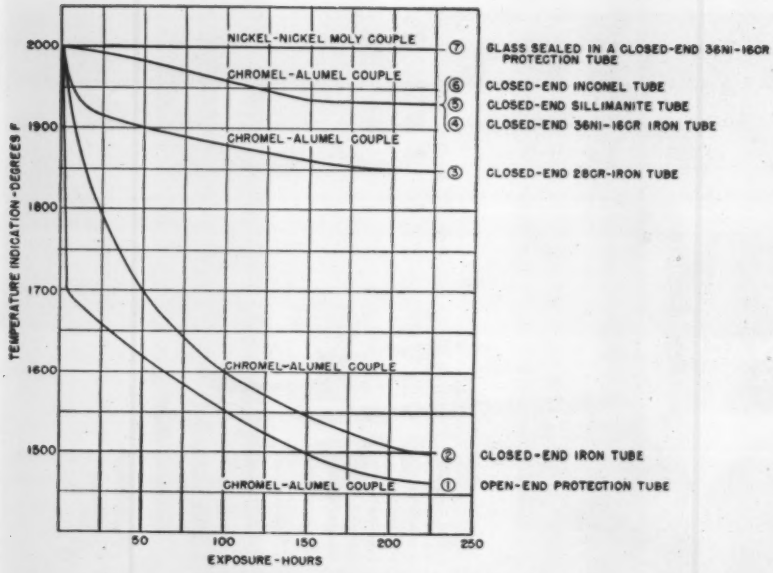


Hydrogen can ruin a good thermocouple unless it is well protected. This chart shows the effect of hydrogen on several materials

verse the connections at the connection block, not at the instrument.

Radiation — At temperatures above 1000° F, virtually all the heat received by the thermocouple is by radiation. In this range, a couple is a radiation detector. Many of the observations on radiation detectors made in part I of this series (STEEL, Feb. 13, p. 108) apply to couples.

Calibration — Most thermocouples are guaranteed for ¾ of 1 per cent of the specified calibration at furnace temperatures above 500° F. In some cases, thermocouples of special grade wire provide about one-half the standard limit of error. Thermocouples can be furnished with calibration at several points and when great accuracy is required, they can be sent to the National Bureau of Standards in Washington for calibration.

Many combinations of materials have been developed, among them copper - constantan, chromel - constantan, steel-alumel, nickel-tungsten and others. In industrial furnace work, the majority of thermocouples are one of the four types shown in the accompanying table.

Cheaper Lead Wire—Expensive thermocouple wire is not used for connecting the thermocouple to the temperature instrument. Extension lead wires are used, either of the same or cheaper materials. Extension wires are usually furnished as two, insulated, 16-gage wires in a common outer braid or sheath.

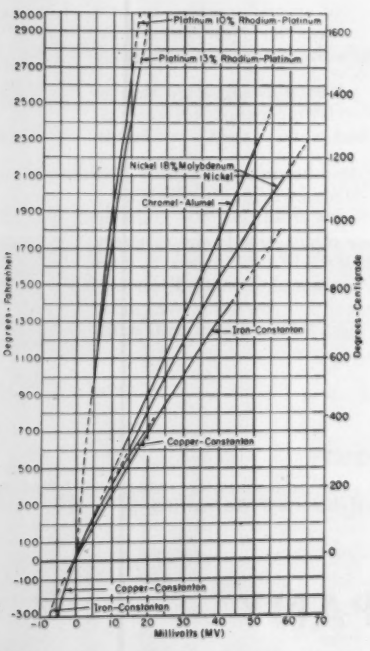
If possible, the extension wire should have no joints between the thermocouple and the instrument.

Joints and Splices—If a joint is necessary, scrape the wires clean, splice and solder or braze. Run extension wires in grounded conduits for protection and to avoid pick-up. Naturally, they should not be run in the same conduit with any other wire or be closer than 12 in. to alternating current.

Thermocouples may be located several hundred feet from the temperature instrument, when potentiometer-type instruments are used. Millivoltmeter distances cannot be so great. Heavier gage lead wire should be used for long distances (or two or more lead wires can be connected in parallel).

Protection — Metal protection tubes are common up to 2150° F. An alloy of about 35 per cent nickel, 15 per cent chromium works unusually well and is not subject to green rot, does not oxidize and has good strength. For higher temperatures, ceramic tubes are used. In other applications, most instrument manufacturers will recommend the proper materials.

Testing—Furnaces can be protected against open thermocouples (or broken thermocouples) by the



Temperature-voltage curves for thermocouples

THERMOCOUPLE DATA

Type	I.S.A. Type	Polarity
Iron	J	+
Constantan		−
Chromel	K	+
Alumel		−
Nickel		−
Nickel Moly		+
Platinum	S	−
Plat. Rhod.	R	+

temperature control instrument. For protection against calibration errors, thermocouples should either be changed at intervals determined by experience or tested.

Testing should be done with the thermocouple in the furnace.

To test the thermocouple, the check thermocouple is inserted in the same tube or well or in an adjacent test hole. The check thermocouple should be of the same type and size as the one being tested; it should not be used for anything else and should be tested frequently against a master standard in a salt pot or small tube furnace.

Do It Yourself — Many users prefer to make their own. Wires for thermocouples should be purchased at the same time from the same manufacturer to insure matched characteristics.

To check wire, use a platinum wire at a known temperature. Iron, copper, chromel and nickel-molybdenum (18 per cent) are positive with respect to platinum, while constantan, alumel and nickel are negative. The sum of the emfs produced by each wire against platinum equals the emf that will be produced when the two wires are used together. If several batches of each wire are on hand, samples from each batch can be checked against platinum, then the batches paired off in combinations which produce the most nearly correct emf.

Another method is to make a thermocouple of the wire to be tested and a working standard of the same kind of wire, whose emf versus platinum has been determined as described. This has the advantage of not requiring an accurate measure of the temperature at which the comparison is made, since the emf developed between two samples of the same material is small (usually less than 0.3 microvolts per degree).

While butt-welded hot junctions are used in commercial thermocouples, this type joint requires special equipment. Most homemade thermocouples use the twisted junction.

Twist Weld—To make a twisted joint, scrape the wires clean, twist two or three times, bringing the ends together. Hold the twisted junction in a flame of an oxygen-illuminating gas torch adjusted to give a neutral flame. When the joint is a dull red, dip it in borax flux (except for platinum thermocouples) and return to the flame. Keep wire of the higher melting point in the hottest part of the flame and manipulate the thermocouple until both wires melt and form a bead at the end.

This may also be done with an electric arc, connecting the thermocouple wires to the positive electrode and drawing the arc with a graphite pencil connected to the negative electrode.

The next article in this series will deal with temperature control instruments (millivoltmeters, potentiometers, etc.). Which ones to use and how charts fit into the picture also will be discussed.

• *Extra copies of this or the six articles in this series on temperature controls are available in quantities of one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

			LEAD WIRE				THERMOCOUPLE			
							Suggested Maximum Temperature °F			
							In Air		Reducing Atmosphere	
Magnetic	Composition	Thermocouple gage	Type	Gage	Resistance*	Accuracy	Open	Enclosed	Open	Enclosed
Yes	Iron	14	Iron	14	0.089		1000	1000	1400	1400
No	55% (Cu)	11	Constantan	16	0.137	±4°F	1100	1100	1400	1400
	45% (Ni)	8		18	0.230		1400	1400	1400	1400
No	90% (Ni)	14	Iront	14	0.049		2000	2000	NR	1400
	10% (Cr)	11				±10°F	2100	2100	NR	1400
Yes	94% (Ni) Rem.Al,Mn,Fe	8	Cupronel	16	0.065		2100	2100	NR	1400
Yes	(Ni)		Alumel	14	0.147	±6°F (±4°F with				
Slightly	82% (Ni)	11	Chromel	16	0.234	C-A Couple)	NR	2150	NR	2150
	18% (Mo)			18	0.380					
No	(Pt)		Alloy							
No	90(87)% Plat(Pt) 10(13)% Rhod(Rh)	24	Copper	24	0.470	±12°F	NR	2800	NR	2800

*Approximate combined ohms at 70° F †Chromel-Alumel couples may use either Chromel-Alumel or Iron Cupronel lead wire NR—not recommened

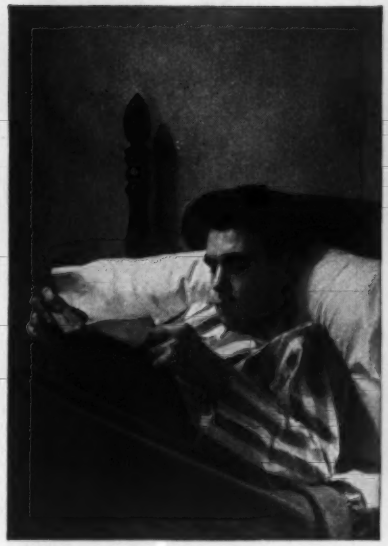
C F & I - W I C K W I R E M A K E S W I R E

PLANE ANSWERS pilot's every direction—thanks to strong, flexible control cables made of CF&I-Wickwire Aircraft Cord Wire. This wire undergoes extremely rigid testing to meet highly exacting specifications.

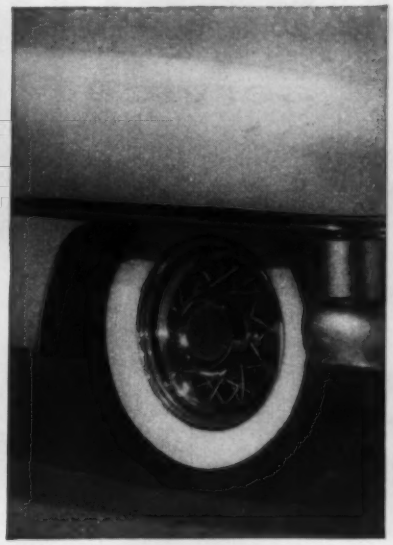
FOR A CLEAN SWEEP. Power street-sweeping machines use bristles of tough CF&I-Wickwire Flat Tempered Brush Wire.

BEAUTY TIPS. Tons of wire are used by beauty shops in the form of bobby pins, hairpins and curlers. CF&I-Wickwire Hairpin Wire is used for these and many other mass-produced cosmetic items.

FOR THOUSANDS OF USES



"SPRING TIME" COMFORT. Coil bedsprings, mattress inner springs and mattress edge reinforcing are all made of CF&I-Wickwire Spring Wire in several tempers and hardnesses.



ROLLING ON WIRE. Strong, rigid spokes for automobile wheels are made of CF&I-Wickwire Spoke Wire.

MAKING BOOK. This eager young student's notebooks and textbooks are bound with CF&I-Wickwire Bookbinder Wire and Spiral Binding Wire.

from holding a plane on its course, to keeping a curl in place... wire is the practical answer!

Wire can answer an almost incredible variety of needs because it can be varied to provide thousands of different combinations of mechanical and physical properties. From wire that can be easily twisted by hand to a rigid, self-supporting wire, it can be "tailor-made" to meet almost any set of requirements. Whatever you assemble, manufacture, or process, look into the many advantages of using CF&I-Wickwire Wire. You'll like doing business with CF&I-WICKWIRE and the careful attention given your own particular requirements.

CF&I-Wickwire Wire is made in plants conveniently located from coast to coast. For detailed information, write our nearest district sales office.

3145

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THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita
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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

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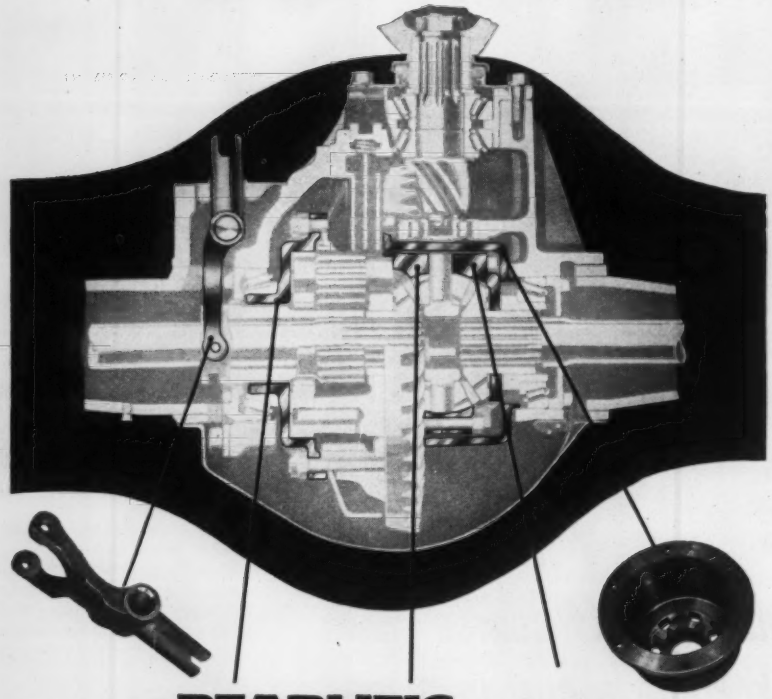
for **HEAVY DUTY** service



PEARLITIC MALLEABLE CASTINGS

The 2-speed truck axle is a *must* under varying load and road conditions because it provides a tailor-made ratio for every condition. But it takes a severe beating under heavy duty conditions encountered in logging, mining, farming, etc.

That's why Eaton Manufacturing Company, leading producer of 2-speed axles, specifies pearlitic malleable — from National — for several vital parts. For Eaton knows that pearlitic malleable has high ultimate strength . . . resists wear under heavy loads at high speeds . . . possesses excellent non-seizing properties. In addition, pearlitic malleable can be given a smooth finish . . . can be either liquid or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

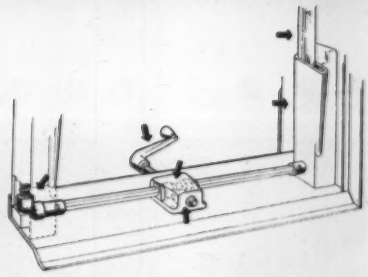
Look your product over critically. Pearlitic malleable castings—from National—can replace costlier fabrication methods . . . can offer opportunities of reduction in weight, machining and assembly time. AA-1197

Photos: Courtesy Eaton Manufacturing Company

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable



Arrows point to zinc diecast parts that . . .

Carry the Workload

AWNING WINDOWS must have working parts that will maintain high strength and close tolerances while exposed to the weather.

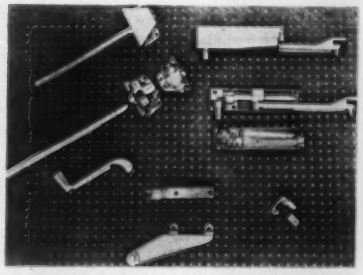
These windows pivot from the top, with the bottom opening outward. A single window is made up of a series of small "glass awnings" that work in unison.

Carry the Load—Denison Corp., North Miami, Fla., maker of awning windows, devised an operating mechanism in which one handle simultaneously moves all windows in a casement.

The complete workload of opening and closing the windows is supported or transmitted through zinc diecastings. These include the hand crank, drive gears, gear and jamb housings, window hinges and hinge brackets.

Cast-In—Split-case construction is used on the jamb and gear housings. Integrally diecast rivets locate the bearing surfaces between the two halves of the case and fasten them together. This permits Denison to encase the jackscrew, protecting it from dust and grit.

All diecast parts are finished with a corrosion-resistant inorganic coating.



Diecast parts of awning windows: Drive gear assembly and housing (upper left); jamb assembly and housing (upper right); hinge, hinge bracket, mounting bracket and hand crank (lower center)

This Month's

GEAR PIX

OVER TWO MILLION rear axle shaft splines have been cold formed in a large automotive plant on a battery of three automatic Roto-Flo spline rollers. Production rate for the 28-tooth, 24/48 diametral pitch splines is 270 per hour on each machine. Tool life is about 150,000 parts per grind.

DOZENS OF AUTOMATIC gear classifiers are now being built by Michigan Tool for 100% inspection control on gears that are being hobbed or shaved. Probe type 3-WAY gear classifiers shown here are in great demand due to freedom from stray chip interference, simplicity of operation and ease of adjustment.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

This Month's

GEAR PIX

VERSATILE SHEAR-SPEED gear shaper shown here cuts 32 different parts for lift truck transmissions and hoists. Production time is reduced as much as 78%, changeover time is about the same as previous methods. Shown are some of the 32 gears, ratchets, sprockets and splines ranging up to 7 inches in diameter, that are being cut. Parts produced per tool sharpening range from 172 to 1200.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

Stronger Casings

Using a tougher steel saves two ways: Less material in fabricating and less to move it when it's made

TRANSFORMER CASINGS are the latest application for low alloy, T-1 steel. With three times the yield strength of carbon steel, T-1 reduces original construction cost, total weight and maintenance expense, according to the Nooter Corp., a St. Louis fabricator.

TRANSFORMER TANK CASING
. . . lighter, cheaper, better in T-1

Example: A T-1 tank casing for a 9000-kva transformer (made by Moloney Electric Co. for the Oklahoma Gas & Electric Co.) weighed just under 3 tons. One made with conventional carbon steel weighs 4 tons. The casing, including braces, is made entirely of ¼-in. T-1 plate. If made of ordinary carbon steel, the tank would have required ⅜-in. plate for the shell and ½-in. plate for the braces.

The saving in maintenance is due to T-1's better corrosion resistance. Transformer casings of this size and type are required to withstand the weather.

Milling Calculator

A plastic dial calculator for determining spindle speeds, feed rates and cutting speeds for lowest cost per piece has been designed by Cincinnati Milling Machine Co., Cincinnati. Price is $1.

DESIGNERS

if you have a dead-end job

send us your telephone number

If you are stuck in a job without a future, it will pay you to investigate the wide variety of openings in our engineering department.

Here, the designer is a key man. He has a virtually unlimited opportunity to gain recognition and advancement. Outstanding men can, and frequently do, build sound, well-rewarded careers in a hurry.

In addition, there are other important advantages: new, higher salary ranges, liberal employee benefit programs, pleasant New England living, many others.

Fill in and mail the attached coupon immediately. We'll treat it confidentially; reply without delay. Your action now may be the first step toward a far better future for you and your family.

Be sure and include your telephone number. We may want to call you.

Mr. E. M. Peterson
Dept. 42, Design Employment
Pratt & Whitney Aircraft
East Hartford 8, Conn.

I would like to learn more about your openings for product and component designers. My experience has been in the following fields:

☐ Nuclear Design
☐ Compressors
☐ Turbines
☐ Structures
☐ Afterburners and Related Equipment
☐ Aerodynamics
☐ Hydraulics
☐ Gears
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☐ Heat Exchangers and Combustion Problems
☐ Bearings
☐ Piping
☐ Controls
☐ Test Equipment
☐ Test Rigs

Total years Mechanical Design experience .....

You can reach me at ..... (telephone) ..... Most convenient hours for receiving calls are between ..... and .....

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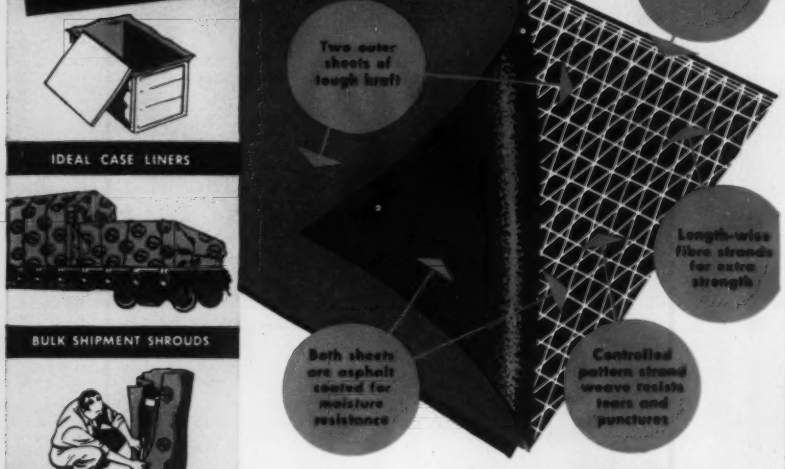
World's foremost designer and builder of aircraft engines

Through rain, sleet or snow... sun, heat and dust...

NO OTHER PAPER PROTECTS LIKE WATERPROOF Wrap·DRI


Anchored edge-strands for tear resistance
Two outer sheets of tough kraft
Length-wise fibre strands for extra strength
Both sheets are asphalt coated for moisture resistance
Controlled pattern strand weave resists tears and punctures

IDEAL CASE LINERS

BULK SHIPMENT SHROUDS

CONFORMS TO ODD SHAPES

TEMPORARY SHELTERS

CORDAGE & WIRE WRAPS

EXPENDABLE TARPAULINS

NOW—with Controlled Pattern reinforcing for maximum strength!

Test after test in actual service proves the superiority of Wrap-DRI'S "Controlled Pattern" reinforcing over other methods. In transit or in storage, you'll find Wrap-DRI protects better — is more economical to use.

SPECIAL FEATURES INSURE BETTER PROTECTION — (1) *Both* outer kraft sheets are asphalt coated to eliminate voids and provide *double insurance* against moisture transmission. (2) Wrap-DRI comes in extremely wide widths — greatly reducing number of lapped joints on large jobs. (3) Closely woven "controlled pattern" fibre reinforcement, bonded in asphalt, increases tear and puncture resistance.

VARIOUS GRADES AVAILABLE — Wrap-DRI is supplied in MEDIUM, HEAVY, and SUPER GRADES — 50, 60 and 63 lb. per M square ft. Or, can be "tailor made" to fit your specific needs. All grades are also supplied Machine Creped for *elasticized* strength and greater flexibility.

PRINT DECORATED TOO! — Wrap-DRI can be imprinted for product identification and effective advertising, for only a few pennies more.

Let Thilco paper "imagineering" help you — Send us complete information regarding your packaging problems. We'll gladly send suggestions and sample grades that solved similar problems for others and should work to advantage for you.

Thilco Papers Include
Glassines and Greaseproofs, Water-Vapor Barriers, special treatment papers, MG and MF Krafts and Special Bags — most of them can be custom DECORATED to your exact requirements.

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Functional Papers FOR PROTECTION THAT COUNTS!

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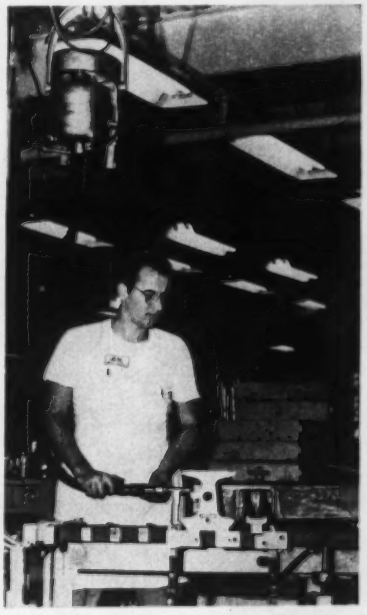
Lighter Reaming

Flexible shaft reamer is lightweight tool, easy for operator to handle

INTERNATIONAL Business Machines Corp., Endicott, N. Y., had the problem of reaming holes 0.813-in. in diameter in the mounting hanger on the main base of its 407 accounting machine.

To eliminate expensive tooling, the company went to a portable, flexible shaft machine. It's a lightweight tool that is easy for the operator to handle and feed into the work.

The Machine — Made by Stow Mfg. Co., Binghamton, N. Y., the unit has a swivel mounting and a hook for hanging up or connecting to an overhead trolley.



FLEXIBLE SHAFT UNIT
. . . used for reaming at IBM

It operates at four speeds—1150, 2100, 3450 and 5650 rpm—and has a 6-ft flexible shaft. The countershaft pulley is mounted on an eccentric which makes it easy to loosen the belt and shift it on the step pulleys. For other speeds, different size pulleys can be used (IBM runs the reamer at 750 rpm).

The flexible shaft machine also can be used to grind, buff, sand, wire brush and drill.

Turret Lathe Has 1000 RPM Spindle Speed

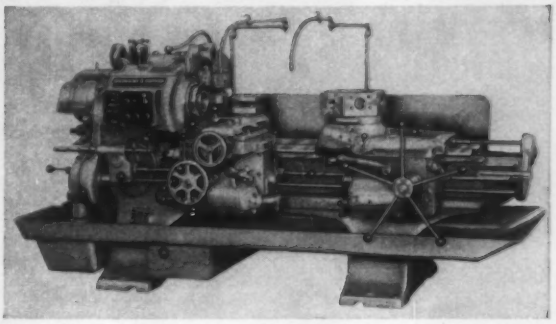
Full capacity of the latest in cutting tools can be used by the Model 21 saddle-type lathe.

A 20-hp main drive motor permits heavy feeds. High spindle speeds provide for nonferrous metals and small diameters.

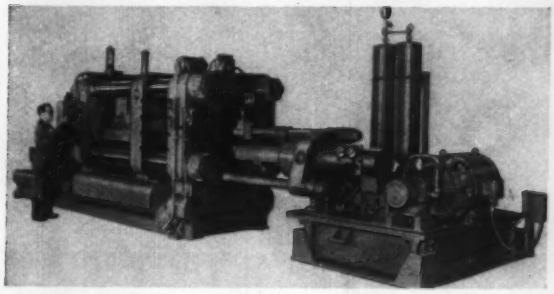
Either the rigid bridge-type cross slide or a full swing side carriage is available.

The full swing carriage will turn a piece 15½-in. in diameter over the cross slide; the bridge-type carriage has a 12½-in. swing.

A self-contained hydraulic bar feed cuts the feed-out time. *Write*: Bardons & Oliver Inc., 1133 W. Ninth St., Cleveland 13, O. *Phone*: Main 1-0197



Diecasting Machine Makes Aluminum Parts Up to 35 lb



Automotive grilles, transmission housings, motor blocks, outboard motor castings and other large parts are made by the 800-ton diecasting machine.

The cold chamber unit needs no tierod adjustment. A pushbutton controls the centeral screw daylight and tonnage adjustment. Die platens are 55 x 59 in.

Central hydraulic and bumper bar ejection add to the machine's flexibility.

Power input is 80 hp. The machine has 9-in. tie-rods, heavy platens and weighs about 81,000 lb. *Write*: Hydraulic Press Mfg. Co., Mt. Gilead, O. *Phone*: 35

Traveling Hopper Holds 1 Cu Yd of Bulk Materials

A 5000-lb dial scale with a tare beam gives accurate weighing of ingredients as they are gathered from overhead storage bins.

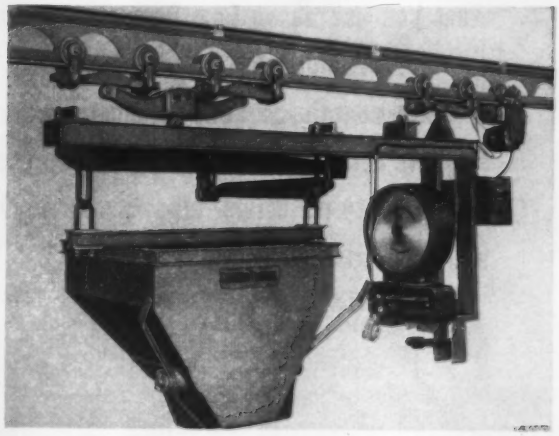
An extra large opening at the top of the hopper is made possible by placing it on one side of the track.

The bottom gate can be operated from both sides of the bucket.

Spring clip markers on the scale speed weighing when similar batches are made up repeatedly.

The load bar supporting the bucket and scale rides on 12 ball-bearing wheels. A tractor drive propels the unit at 150 fpm.

The control is the pushbutton, automatic-accelerating type. *Write*: Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O. *Phone*: Wickliffe 3-3700

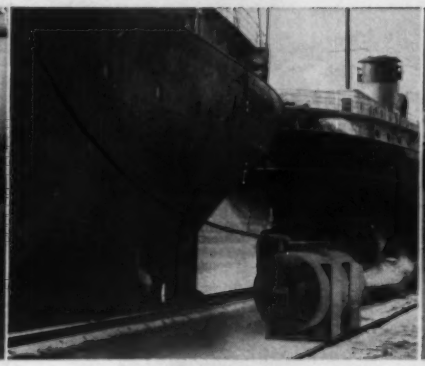


Here's *MASS-HANDLING* of bulk

What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!

Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department.

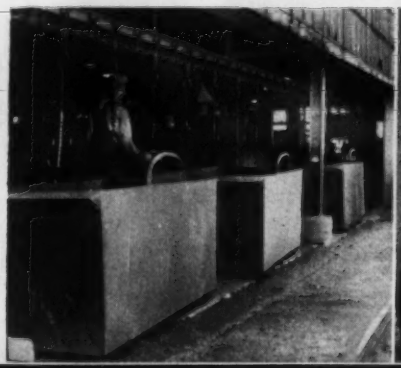


Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.

A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids in top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.



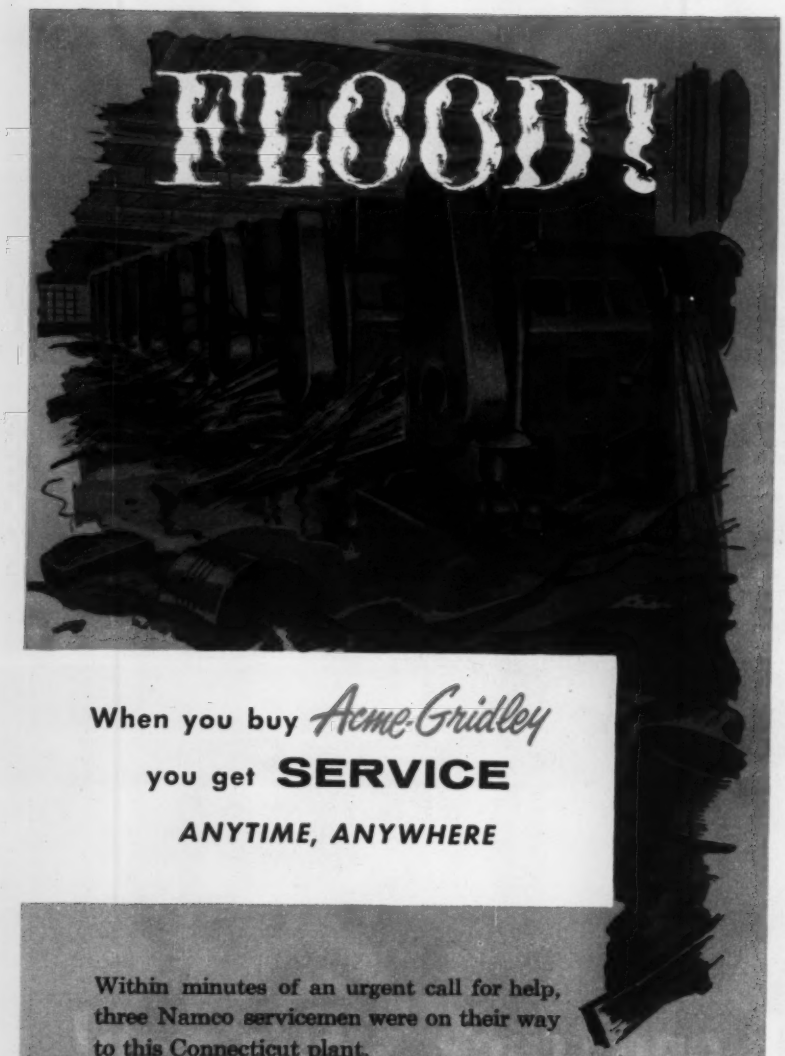
materials with one truck...one man!

A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

Records of performance in dozens of installations prove beyond question that savings are tremendous! The Dempster-Dumpster System cuts costs of equipment and operation. It is common knowledge that one Dempster-Dumpster will perform the work of several conventional trucks, reducing investment accordingly. This system eliminates standing idle time and re-handling of materials. Once placed in these containers, materials remain there until hauled to destination. Efficiency, sanitation and good plantkeeping are big advantages. Materials to be transferred or disposed of are constantly being placed in the containers as they accumulate. Containers for handling refuse are fire-proof, rat-proof and scavenger proof.

With no obligation on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Write us for complete information today! Manufactured exclusively by Dempster Brothers, Inc.

DEMPSTER BROTHERS 626 Dempster Building, Knoxville 17, Tenn.



When you buy *Acme-Gridley*
you get **SERVICE**
ANYTIME, ANYWHERE

Within minutes of an urgent call for help, three Namco servicemen were on their way to this Connecticut plant.

Service without delay prevented extensive exposure damage, returned machines to production sooner.

Consider the importance of such "help-when-you-need-it" the next time you purchase automatic bar or chucking machines.

National Acme

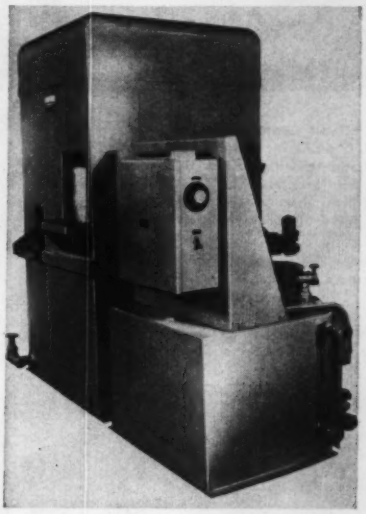
The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

THE NATIONAL ACME COMPANY • 189 East 131st Street, Cleveland 8, Ohio

NEW PRODUCTS and equipment

Degreaser

Small parts and chips are moved in a circular uphill motion. Parts pass through a liquid immersion, liquid rinse and solvent vapor zone.



The machine can clean up to 3000 lb an hour. It is of welded steel construction. The original charge of solvent capacity is 85 gallons. *Write*: Manufacturers Processing Co., 1360 Hilton Rd., Detroit 20, Mich. *Phone*: Jordan 4-6326

Grinding Wheel

A vitrified grinding wheel is said to be cooler cutting and more efficient.

The pastel yellow of the wheel contrasts sharply with the work, enabling operators to see the work better. *Write*: Electro Refractories & Abrasives Corp., Buffalo, N. Y. *Phone*: Washington 5259

Adhesives for Honeycombs

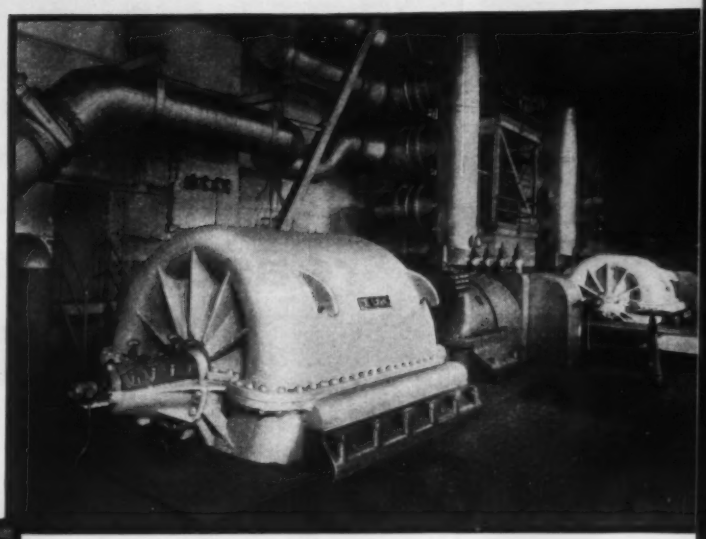
Two resin-type thermosetting adhesives will bond a honeycomb of phenolic - impregnated kraft paper to thin aluminum, stainless steel or magnesium sheeting.

Tests show high tensile strength, resistance to temperature and humidity changes.

Column and flexure strength are excellent, and the sandwich struc-

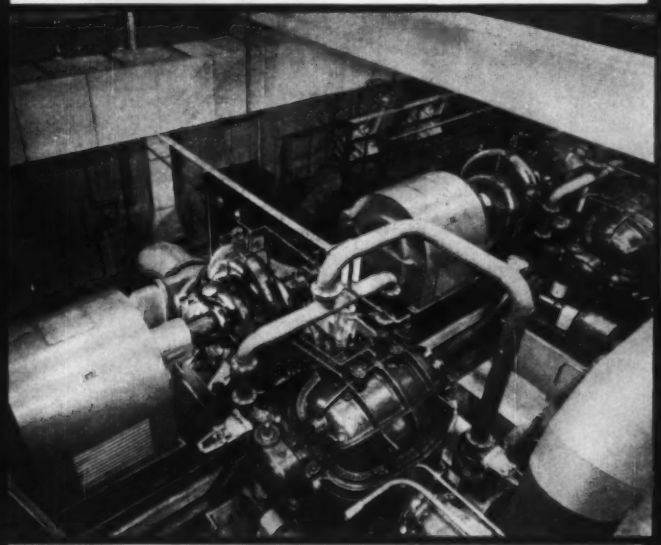
DE LAVAL
CENTRIFUGAL BLOWERS AND PUMPS

stay on the line for years at Jones & Laughlin

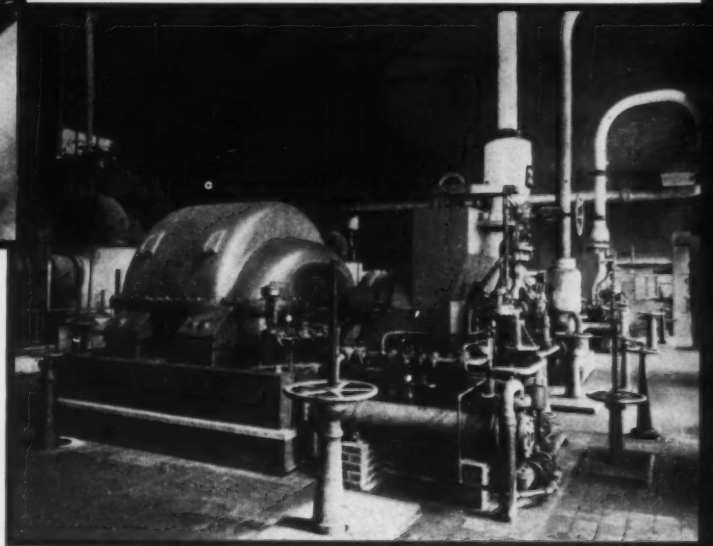


Jones & Laughlin reports: "*We have been using De Laval equipment for many years, and from our experience we have learned that De Laval blowers and pumps are inexpensive to maintain. Service is excellent. We can get spare parts quickly.*"

Three De Laval 22,000 gpm motor-driven pumps are on the job at Jones & Laughlin Steel Corporation in Pittsburgh, Pa. These units are used to pump river water to the open hearth and general mill. Installed in October 1951, these three pumps "have not had any downtime at all since their installation except for periodic inspections," Jones & Laughlin reports.



These two De Laval centrifugal blowers, each rated at 100,000 cfm, are in use 24 hours per day, seven days per week except for a yearly inspection period. Since installation, there has been only 24 hours downtime in one of these blowers with a maintenance cost of about $400. "That's very little for this type of equipment," says the Jones & Laughlin blower room foreman.



This is one of three De Laval gas exhausters, operating at 48,000 cfm around the clock. Two of these units can handle maximum capacity; the third is used as a spare. Jones & Laughlin says, "Without good gas exhausters you would have to 'bee hive' (open the top and permit the gas to go free), thus losing our by-product."

Send for Bulletin 0504

DE LAVAL *Pumps and Blowers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

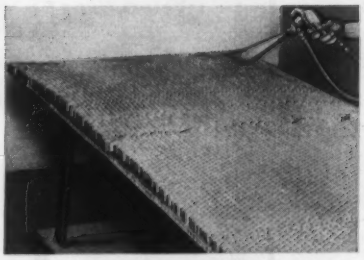
DL 297

NEW PRODUCTS and equipment

ture will resist both dynamic and dead loads.

One adhesive is diluted with acetone before spraying; the other can be used as received.

Typical applications include floors, table tops, partitions and walls in aircraft, house and truck trailers, barns and prefabricated housing. Adhesives & Coatings

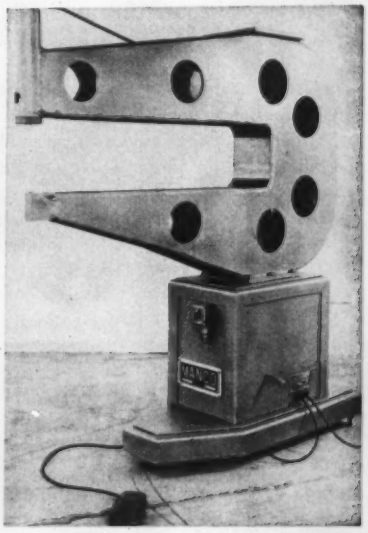


Division, Minnesota Mining & Mfg. Co., 411 Piquette Ave., Detroit 2, Mich. *Phone*: Trinity 5-7111

Aircraft Riveter

Varying thickness of metals can be fastened on this hydraulic riveter without adjusting the power stroke. The ram develops pressure as it meets resistance until it develops its maximum thrust of 12 tons.

Cycling is automatic, and the pressure obtained in the final thrust can be adjusted by one control.



An air-to-oil booster powers the unit and develops the maximum thrust at 80 lb of air pressure.

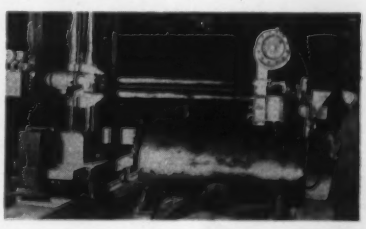
Maximum traverse stroke travel is 6 in.; the power stroke maximum is $\frac{5}{8}$-in. The reach is designed to the user's needs. *Write*: Manco Mfg. Co., Bradley, Ill. *Phone*: 3-8231

Welding Manipulator

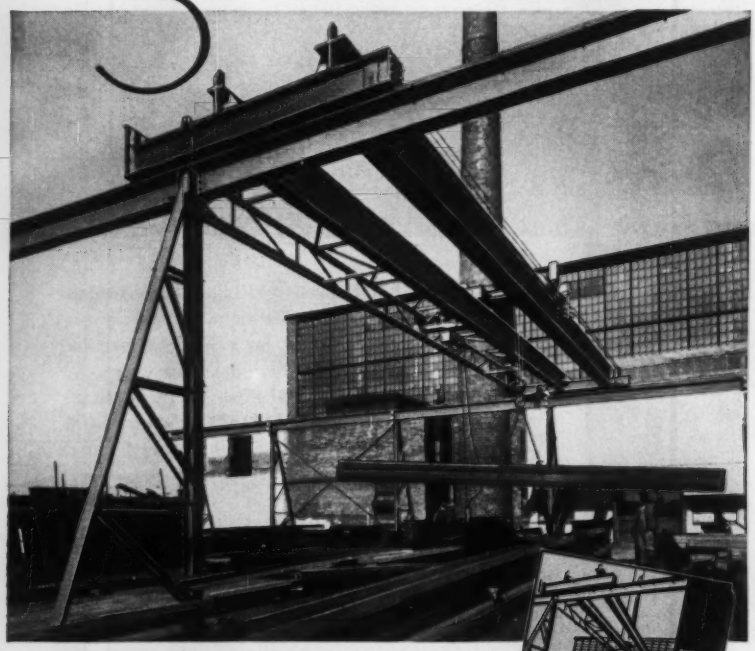
All types of welding heads, submerged arc as well as shielded gas types, can be used by the automatic manipulator.

A twin tube mast and ram give rigidity. The mast will rotate 360 degrees.

The unit has three directional



3 reasons why...



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- *You save on production cost* because time and material savings of modern manufacturing techniques are passed along to you.
- *You gain long term efficiency*, because CRANEMASTER is soundly designed and carefully built for maximum performance, minimum maintenance.

CAPACITIES to 15 TONS—SPANS to 60 FT.

send for BULLETIN C-110

Describes in detail the many design and operating advantages of CRANEMASTER overhead traveling Cranes. Also explains how Abell-Howe provides competent service from original survey to final installation.

ABELL-HOWE COMPANY 7747 Van Buren Street • Forest Park, Illinois

travel. It has power-operated vertical travel, variable-speed ram movement and variable-speed carriage drive.

Each unit is custom assembled and wired. *Write*: Positioning Equipment Division, Worthington Corp., Plainfield, N. J. *Phone*: Plainfield 7-1200

Remote Crane Control

A new electronic system allows traveling cranes to be remotely controlled.

Installation is simple; carrier current over existing power rails is the only circuit needed.

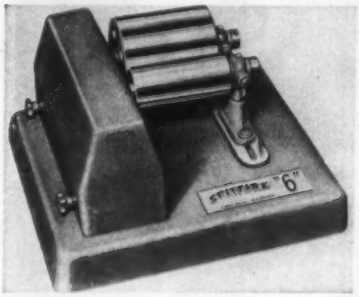
As many as eight cranes can be controlled on one power circuit by using different carrier frequencies. One operator can control more than one crane.

By using two control panels, a crane can be loaded by one man and sent to the other end of the runway where another man can unload it and send it back. *Write*: Femco Inc., Irwin, Pa. *Phone*: Underhill 3-3200

Cylindrical Lapping

A bench-type cylindrical lapping machine microfinishes parts to 1 rms.

It laps plug gages, cylindrical pieces, tapered plugs, pins and other parts up to 6 in. in diameter.



The machine uses vented rollers to eliminate cooling-off periods. Rings, collects and chucks are not used. *Write*: Spitfire Tool Co., 2931 N. Pulaski Rd., Chicago 41, Ill. *Phone*: Palisade 5-1610

Castable Refractories

Two new hydraulic setting refractories are made with a base of calcined material which hardens without heat. They are available with heat stabilizers which eliminate the strength losses of regular castables in the 1300-to-2000°F range.

NEW PRODUCTS and equipment

A high-strength castable, about twice as strong as regular castables, is for forming hearths, doors and supported roofs. Its service limit is 2900°F.

A medium-strength castable has a high melting point; its service limit is 3000°F.

The dry form of the castable enables the user to mix it with water to the desired consistency for pour-

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The best and latest in tools, machines, inspection equipment, automation devices, controls and accessories to cut costs and boost profits—many never before shown anywhere.
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Freedom from deep surface defects scores a point for Pittsburgh tubes. Absence of defects holds down rejects, speeds up production.

Steel That Stones Polish

Pittsburgh Steel Tubes Help Ohio Honing Establish Unusual Claim—

Firm Hones Hydraulic Cylinders With No Preliminary Machining

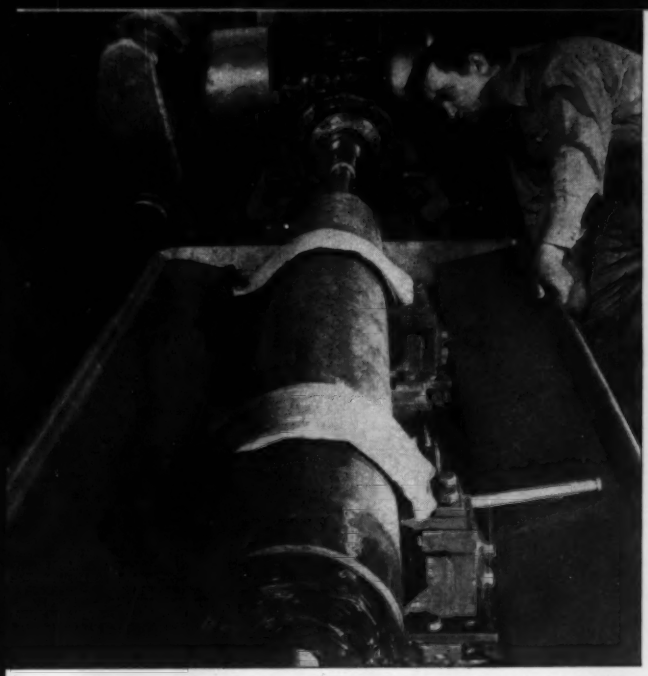
Al Blewett, president of the Ohio Honing & Hydraulic Company, proudly claims his Cleveland, Ohio, plant is one of the few in the country where seamless mechanical tubing is honed internally and externally without first being bored, ground or turned.

The details of his technique and special equipment are Mr. Blewett's secret—but he is quick to say that quality tubing from Pittsburgh Steel Company plays an important role.

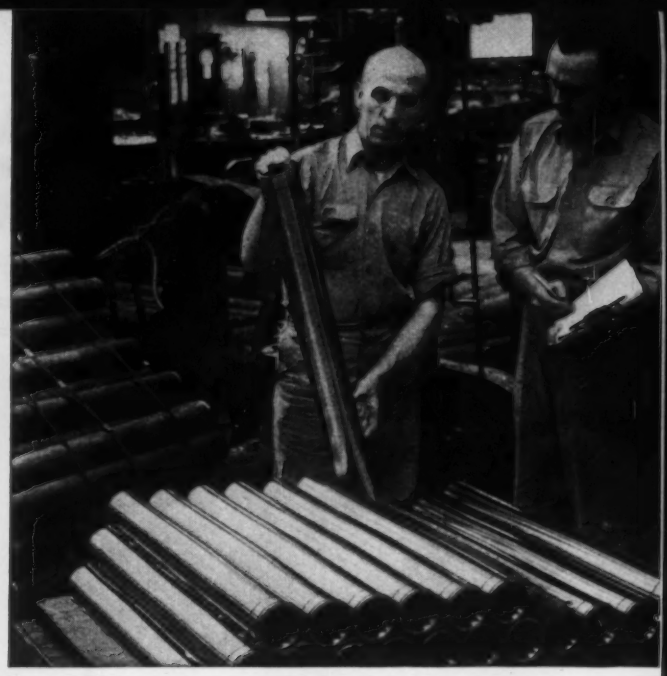
Ohio Honing, which makes a specialty of honing, uses Pittsburgh tubes to make cylinders for air and hydraulic cylinder customers throughout the United States and Canada. The company processes tubes for some customers and also produces complete air and hydraulic cylinders for other customers to their specifications.

Ohio Honing makes cylinders as small as 6 inches long while its largest cylinders measure up to 30 feet long. The 6-inch cylinder has an in-

(Advertisement)



Internal Honing. The operator is removing .045 inch from this 7½ inch I.D. Pittsburgh tube. The tube is 58½ inches long and has a wall thickness of ⅜ inch.



Before and after internal and external honing. Al Blewett, president of Ohio Honing, left, checks a finished tube with Office Manager Kenneth Sherman.

side diameter of one inch and the 30-foot cylinders have a 24-inch inside diameter.

Mr. Blewett declared the consistent high quality of the seamless mechanical tubing made by Pittsburgh Steel is so important to his operations that he recommends them to customers for whom he does honing work only. Pittsburgh tubes also are his choice for cylinders which he starts and finishes in his own plant.

• Requires "Perfect Finish."

"We must have tubing without defects so that .035 to .045 inch honing will give us a perfect finish," declared Mr. Blewett. "Our scrap on tubes is very low because Pittsburgh Steel tubes are unusually free of defects."

Approximately 7,000 tubes pass through Ohio Honing's plant every month. Many of them get both internal and external honing. Yet the number of scrapped tubes is negligible.

That low rejection rate makes Pittsburgh tubes a prime favorite with Ohio Honing. Mr. Blewett also gives them a high score on concentricity, straightness, and weldability on automatic welders.

"And we can get the tubes we want in standard sizes which are readily available," he pointed out.

Excellent performance in production and high quality in the finished product are assured when you use Pittsburgh tubes in your tubing application. Let Pittsburgh tubes prove themselves on your production line.

Just ask a Pittsburgh Steel representative to call on you or write now for the new tubing handbook.

Pittsburgh Seamless Mechanical Tubing is also available from:

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

The Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Limited
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Co.
Boston, Massachusetts

Ward Steel Service Company
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(Advertisement)

ing, molding or ramming. *Write*: Refractories Division, Robinson Clay Product Co., 65 W. State St., Akron 9, O. *Phone*: Portage 2-8601

Punch Press

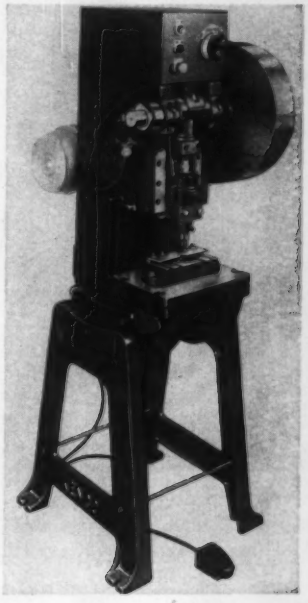
This 15-ton unit features safety, high production versatility and low-cost maintenance.

The operator must press two widely spaced buttons at the same time to single-trip the machine.

The flywheel is eliminated. In single-stroke operation, press and motor go dead after the stroke, eliminating stored-energy, double-tripping hazards.

The selector switch is equipped with a lock. The absence of standard clutching eliminates loud noise and the hazard of mechanical clutching.

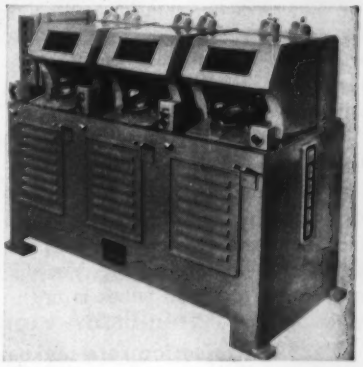
Disconnecting the power actuates a heavy-duty safety brake. The safety stop button will halt the machine instantaneously



The press can single-stroke up to 60 times a minute. Continuous operating speeds range from 20 to 200 strokes a minute. *Write*: Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif. *Phone*: Angelus 1-7955

Gear Chamfering

Both inside and outside edges of hypoid gear teeth are burred and chamfered by this three-station grinding machine.



Three gears are machined simultaneously; production is 300 an hour. Two spindle-mounted grinding wheels are at each work station.

Balanced spindles are adjustable, so that grinding wheels may

"Look! It soaks up grease just like a sponge."

LAN-O-KLEEN removes 95% of all dirt and grime encountered in industry.

Easily – and safely!

LAN-O-KLEEN helps to protect the skin as it cleans. WEST – *in pioneering the development of "double action" industrial cleaners* – was the first to impregnate *beneficial amounts* of free lanolin into a corn meal type hand cleaner.

LAN-O-KLEEN is economical to use. It bulks greater than most other hand cleaners – *therefore goes farther per pound.* Too, the sturdy LAN-O-KLEEN dispenser rations just the right amount to do a quick, thorough cleansing job.

LAN-O-KLEEN is one of a group of WEST products formulated for the prevention and control of industrial dermatitis. Workers' hands are their most valuable tools. By helping to prevent dermatitis, you can help keep costs down – *by keeping workers on the job at maximum efficiency.*

A specially trained WEST representative will gladly tell you more about LAN-O-KLEEN and the other products used in the WEST Dermatitis Control Plan. Just write or call your local WEST office.

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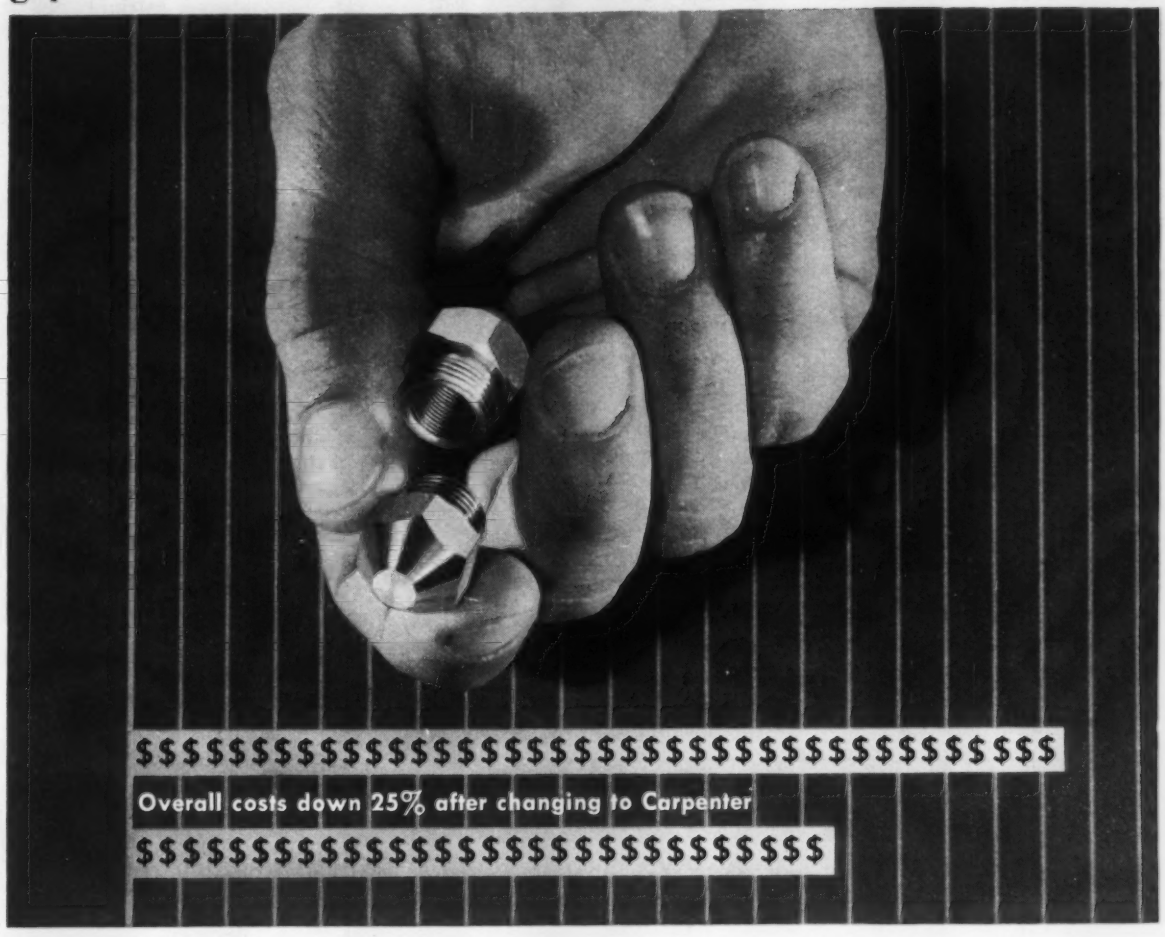
Carpenter ... pioneers in specially-engineered steels through continuing research



HOW FAR CAN YOU GO

in holding down production costs of critical parts?

Fast, steady output and exceptionally fine finishes are essential in the production of these oil burner parts. With the steel first used, rejects were running too high, machine speeds had to be reduced . . . costs were excessive.

Here was a challenge. Was there a steel which would give equal or improved performance in the field, and machine easier and finish better in the shop? One of Carpenter's specially-engineered steels provided the answer. Now rejects are reduced 15% . . . finishes are vastly improved . . . and overall costs are down a healthy 25%.

How far can you go in improving both the fabrication and performance of critical parts you produce? We'd like to help you answer that question . . . help you raise your sights on the opportunities for improvement that exist with Carpenter-engineered specialty steels.

Start by sending for Carpenter's 32-page book, "Service on Specialty Steels." It gives you an inside look at how a specialty steel mill operates to serve you better. *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

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Carpenter STEEL

for product improvement

be properly set against the gear teeth.

A bracket at each work station holds the mating pinion gear while work is being done on the ring gear.

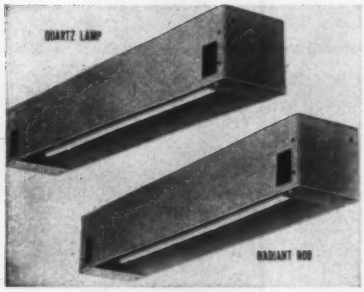
The machine handles various sizes. Straight and spiral bevel gears can be chamfered by adjusting the tooling. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280

Oven Section

Radiant heating components assemble easily into complete infrared ovens.

Quartz lamp sections give product temperatures of over 1000°F. The lamp has a high temperature (4000°F) tungsten filament sealed in an inert gas atmosphere. Rated life is over 5000 hours.

The quartz lamp is recommended for high-temperature, short-cycle uses where instantaneous response is needed.



Radiant rod equipment is for rugged-duty applications. In many cases, it reduces the number of units needed by one-fourth to one-third. Radiant rod sections interlock to form oven walls of high intensity. *Write*: Fostoria Pressed Steel Corp., Fostoria, O. *Phone*: 7721

Rotary Index Table

A wide peripheral bearing near the edge supports this steel table top. It's 12 in. in diameter, ¾-in. thick.

It can be set to 4, 6, 8, 12 or 24 stations, and can operate at up to 150 index movements a minute (at the 24-station setting).

Skipping of stations is impossible. The index cylinder piston seats against the cylinder head at the end of the index movement. Loads up to 500 lb can be carried without jarring.

Optional feature: Built-in automatic switch actuators. *Write*: General Automation Products Co., P. O. Box 14, Birmingham, Mich.

Tube Expander

This all-air driven tube expander features a control with torque output calibrated in foot-pounds.

The method of registering torque at the output spindle prevents

tubes from being over or under-rolled. Readings are precise and consistent regardless of hole variations in the tube sheet.

The drive control eliminates overstressing of tube sheets, reduces warpage and ligament "push-over."

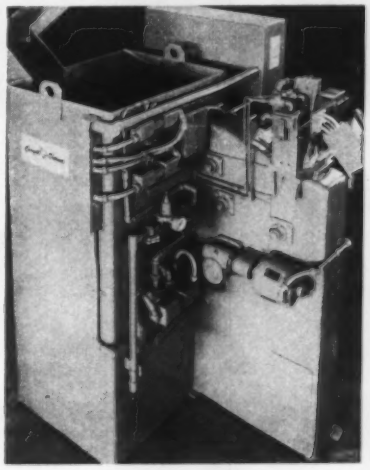
The drive will produce 14 foot-pounds of torque at 90 psi. Maximum air consumption is 12 cubic feet per minute. *Write*: Thomas C. Wilson Inc., 21-11 44th Ave., Long Island City, N. Y. *Phone*: Ravenswood 9-3360

Hopper Feeder

This machine receives parts, such as gear blanks, bearing races, pistons, etc., in random order, then discharges them positioned for a subsequent machining operation.

The hopper feeder can be used with a wide range of machines, processes and part sizes and shapes.

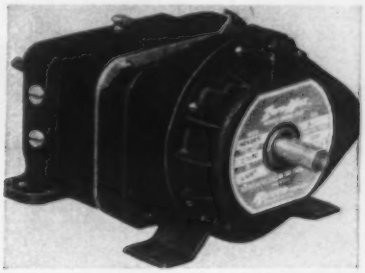
It can be equipped with a conveyor system to elevate parts up to 15 ft and deliver them overhead to a machine 50 ft away. *Write*: Cargill Detroit Corp., Birmingham, Mich. *Phone*: Midwest 4-5400



NEW PRODUCTS and equipment

Gear Reducer

Variable speed (from true zero to the maximum of the unit) is provided by building a gear head into the output side of a fractional horsepower speed transmission.



Gear reductions of 2, 3, 4 and 5 to 1 that develop 20 to 100 inch-pounds of torque are available. Input and output shafts are parallel and the output shaft rotates counterclockwise. *Write*: Revco Inc., 1900 Lyndale Ave. S., Minneapolis, Minn. *Phone*: Federal 5-8615

Now you can buy CUSTOMIZED conveyors in pre-fabricated STANDARD sections

In a **single glance,** you can see all of the advantages of MAY-FRAN STANDARDIZED components.

The five standard sections shown can be assembled to form virtually any type of *"customized"* conveyor for the handling of stampings, formed metal parts, forgings, automotive scrap, chips and turnings.

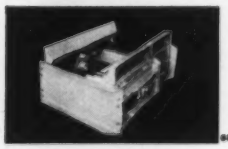
Straight sections . . . concave or convex sections . . . take-up charge and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

A single glance at the MAY-FRAN conveyor standardization program, and you will see savings never before possible. In addition you will see unsurpassed conveyor flexibility.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is **FIRST** again with *standardized* components for your *customized* installation.

Write today for complete information.

. . . AUTOMATION . . . . . AND YOU!



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NEW literature

Write directly to the company for a copy

Bearing Bronzes

Advantages of continuous-cast bearing bronzes from 5 to 9 in. in diameter are described—bulletin 301, 6 pages. Continuous-Cast Products Department, American Smelting & Refining Co., Barber Station, Perth Amboy, N. J.

Aluminum

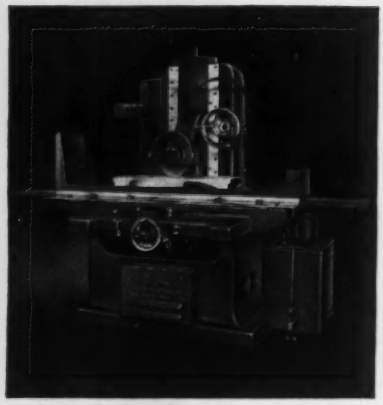
Mill products, including sheets, plates, foil, pig, alloy ingots, rods, bars, wire, forgings and extrusions, are described—24 pages. Industrial Service Division PR 256, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

Clutches

Standard clutches and clutch-coupling units for overrunning, indexing and backstopping applications are described in bulletin 103-C, 8 pages. Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich.

FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS



Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.

That's why so many tool room men insist on Grand Rapids Grinders.

Grand Rapids No. 55 Hydraulic Feed Surface Grinder
This precision tool room type machine Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

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GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON COMPANY 407 Straight Ave., S.W., Grand Rapids, Mich.

Aircraft Steels

Here is condensed information on Army, Navy and government aircraft steel specifications—68 pages. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Fractional Horsepower Motors

Direct current motors and equipment are presented in bulletin GEA-6068, 12 pages. General Electric Co., Schenectady 5, N. Y.

Synthetic Fluids, Lubricants

Properties, uses and characteristics of polyalkylene-glycol derivatives are presented in 52-page bulletin 6500D. Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.

Diemakers' Supplies

Die sets and supplies are illustrated in a catalog containing over 200 pages of technical information. Danly Machine Specialties Inc., 2100 S. Laramie Ave., Chicago 50, Ill.

Solvent Detergents

Cleaning materials that combine the oil and carbon-dissolving abilities of solvents with qualities of surface-active agents are described in a 16-page bulletin. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Ultrasonic Testing

Principles of ultrasonic testing and the equipment used are presented in bulletin 50-105, 8 pages. Sperry Products Inc., Danbury, Conn.

Perforated Metals

Patterns, hole size, centers and per cent of open area of perforated metals are given in catalog 62, 128 pages. Harrington & King Perforating Co., 5627 Fillmore St., Chicago 44, Ill.

Handling Sodium

A 40-page booklet tells how to handle metallic sodium on a plant scale. U. S. Industrial Chemicals Co., division of National Distillers Products Corp., 99 Park Ave., New York 16, N. Y.

FILMS AVAILABLE

"Progress in Precision" shows four main groups of surface imperfections, their effects and how to measure finish. The 30-minute, 16-mm. sound film presents a honing process which provides an excellent finish. Advertising Dept., Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich.

Diamonds are a tool's best friend

Grinding keen edges on cemented carbide cutting tools can be tricky. The material is extremely hard and brittle... easily harmed by excessive heat. CARBORUNDUM's new B-7 Resinoid Bond Diamond Wheels grind unusually free and cool—reduce the danger of checking or cracking the carbide. Less pressure is needed to achieve accurate sizing to close tolerances, and to produce razor-sharp edges. And CARBORUNDUM's Diamond Wheels hold form better, last longer... deliver greatly increased tool life. Ask your CARBORUNDUM Distributor or salesman for free copy of booklet, "Grinding Cemented Carbides," or write The Carborundum Company, Niagara Falls, N. Y. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

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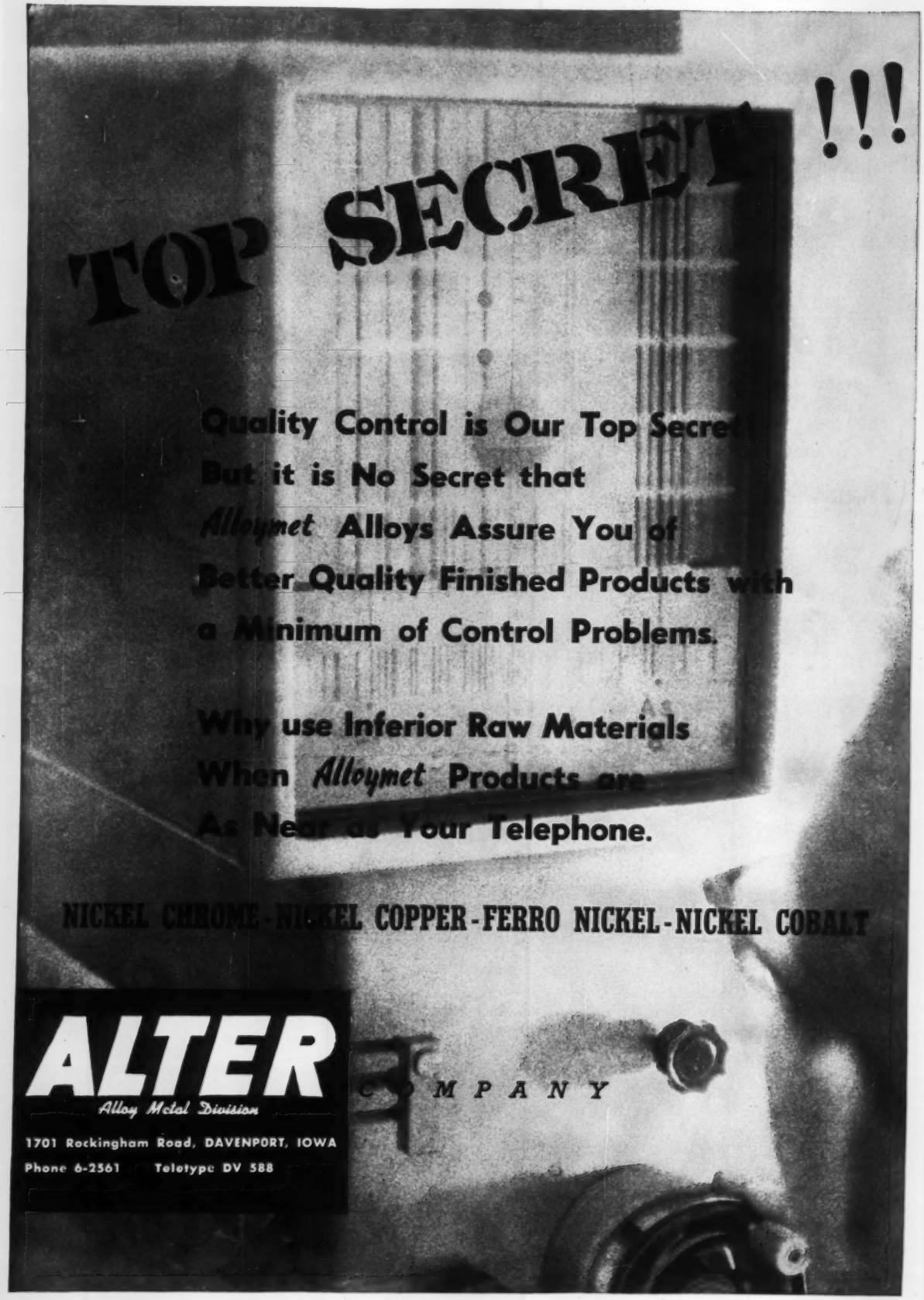
continually puts more sense in your abrasive dollar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STEEL

February 20, 1956

Market Outlook

STRONG steel demand is shaping up for the second half of this year.

The auto industry, largest single user of steel (it consumes one-fifth), is planning early introductions of 1957 models—some are expected to arrive in August and September. Demand for the new could make the auto industry clamor for steel.

BUILDING BUSINESS— The construction industry, second largest user of steel, is making more than seasonal gains in booking new business (see page 83). Much of this work will be put into place in the last half of this year. Some structural steel fabricators are booking business into 1957 and are predicting their product will be in tight supply for the next 18 months. Contributing to the construction boom is the improvement and expansion program of the steel industry. This year it will spend $1.2 billion—its greatest annual outlay in history.

BOOKED UP— Enough railroad freight cars are on order to keep production of them going through the last half. On order on Jan. 1 were 147,320 units. Not since 1923 have more freight cars been built in a year. A freight car takes an average of 22½-tons of steel.

Shipbuilders, whose business has been slow, are booking some orders. Their steel needs will show up on second-half order books.

PINCERS— Adding tightness to the second-half steel market may be a reduced supply. Summer vacation schedules in mills customarily cut output in the last half. Also a threat to production in that period is the possibility of a steelworkers' strike growing out of labor contract negotiations at midyear. A number of issues are at stake in this year's negotiations (see page 65).

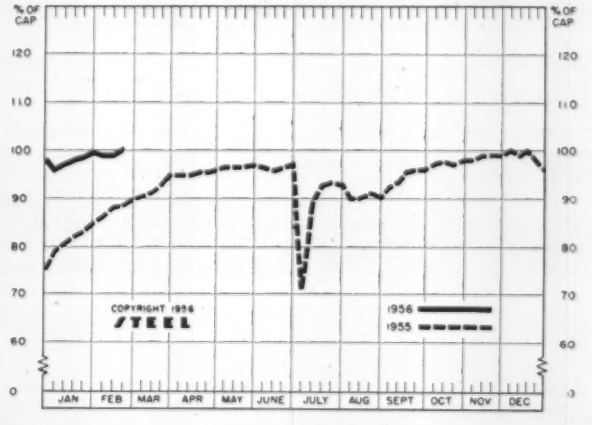
Even though the auto industry has currently lessened its pressure for steel, the over-all demand exceeds supply. Appliance makers are pushing for more steel sheets than their quotas call for. Tin plate demand is expanding seasonally, and there, too, every user wants more tonnage than he has been allotted. Heavy demand for steel plate has sharpened buyers' usage of defense ratings to get onto order books.

BOOSTER— A stimulus to current demand is the likelihood of further increases in steel prices. Steel inventories are not high, so consumers are inclined to continue to lay in tonnage if they can get it.

FULL TILT— To try to fill the demand, mills produced steel for ingots and castings at an average of 100 per cent of capacity in the week ended Feb. 19. Production in some of the districts was several points above theoretical capacity. At the rate mills are going this month, production will set a record for February. January ingot output (10,811,000 net tons) was the highest ever produced in a month. The nation's production rate that month was 99.1 per cent.

PRICES— Steel prices remained steady and kept STEEL's price composite on finished steel at $127.91 a net ton. Steelmaking scrap, however, continued its price slide and lowered STEEL's steelmaking scrap composite for the week ended Feb. 15 to $49.00, a drop of $1.33 from the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Feb. 19	Change	Same Week 1955	Same Week 1954
Pittsburgh	102	— 1*	88.5	85.5
Chicago	98	— 1.5*	91.5	85.5
Mid-Atlantic	101	0	86	74
Youngstown	100	+ 2	90	70
Wheeling	100.5	0	94	76
Cleveland	105	+ 5*	92.5	78
Buffalo	105	0	100	73
Birmingham	96.5	+ 1	85.5	80
New England	73	—15	88	65
Cincinnati	94.5	— 4	88	74.5
St. Louis	104.5	+14.5	102.5	35.5
Detroit	103	+ 4	88	72
Western	107	0	88	79
National Rate	100	+ 1	88.5	74.5

INGOT PRODUCTION‡

	Week Ended Feb. 19	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	149.9†	151.8	151.7	133.8
NET TONS (In thousands)	2,408†	2,439	2,437	2,150

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 59 Technical Outlook—p. 107

Price Indexes and Composites

FINISHED STEEL, Price Index (Bureau of Labor Statistics)

	Feb. 14 1956	Feb. 7 1956	Month Ago	Jan. Average
(1947-1949=100)	157.1	157.0	155.6	155.3

AVERAGE PRICES of Steel (Bureau of Labor Statistics)

Week Ended Feb. 14

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	167.250
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.425	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.800	Wire Drawn, Carbon	8.575
Bars, C.F., Alloy	12.275	Wire, Drawn, Stainless 430 (lb)	0.587
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.473
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 15 1956	Week Ago	Month Ago	Year Ago	5-Yrs. Ago
Index (1935-39 av.=100)	209.10	209.10	209.10	194.53	171.92
Index in cents per lb	5.665	5.665	5.665	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.91	$127.91	$127.91	$117.82	$106.32
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	52.16
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	53.27
Steelmaking Scrap, GT	49.00	50.33	53.33	36.17	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 15 1956	Week Ago	Month Ago	Year Ago	5-Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	4.18
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$53.00
Basic, Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	59.00	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	205.00†	205.00†	205.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commision)					
No. 1 Heavy Melt, Pitts.	$49.00	$50.50	$54.50	$36.50	$45.00
No. 1 Heavy Melt, E. Pa.	51.00	51.50	55.00	38.00	43.50
No. 1 Heavy Melt, Chicago	47.00	49.00	50.50	34.00	43.50
No. 1 Heavy Melt, Valley	52.50	53.00	58.50	36.50	45.00
No. 1 Heavy Melt, Cleve.	49.50	49.50	54.50	34.00	44.00
No. 1 Heavy Melt, Buffalo	46.50	46.50	47.50	32.00	44.00
Rails, Rerolling, Chicago	66.00	66.50	72.50	49.50	52.50
No. 1 Cast, Chicago	46.50	46.50	51.50	40.00	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

Daily Nonferrous Price Record

	Price Feb. 15	Last Change	Previous Price	Jan. Avg.	Dec. Avg.	Feb. 1955 Avg.
Copper	43.00-52.00	Feb. 2, 1956	43.00-51.00	46.700	46.053	33.000
Lead	15.80	Jan. 13, 1956	16.30	15.960	15.358	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.440	13.000	11.500
Tin	100.625	Feb. 14, 1956	100.50	105.067	107.98	90.908
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	23.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

A SHORT CUT TO A FINISHED PRODUCT

CUT POLISHING COSTS IN HALF WITH Formbrite

the new superfine-grain drawing brass with the built-in finish

The secret is in the grain: Special methods of rolling and annealing produce in Formbrite* a grain structure so fine that often a simple color buff will bring it to a bright, lustrous finish.

Formbrite is also harder, stiffer, springier and more scratch resistant—yet it is surprisingly ductile, readily stamped, formed, drawn, and embossed. And Formbrite plates beautifully.

More and more companies are using Formbrite to cut their polishing costs and get superior products—at no extra cost over ordinary drawing brass. They often save more than the cost of the metal itself.

Globe Lighting Products: Reports savings in polishing cost of from 26% to 55% in various components of their high-quality, solid brass lighting fixtures. Work pile-ups were eliminated in the polishing room, too.

Farrington Mfg. Co.: Rejects after polishing dropped from 11% to under 1% after switch to Formbrite in frames for "jewel-box" case for an electric shaver. A better finish in one faster pass through the automatic polishing machine.

Jarco Metal Products, Inc.: Polishing costs cut 40% in deep-drawn pen, pencil, and lipstick cases. Uniformity of Formbrite eliminated shutdowns for adjustments in long-run production.

Spill-Stop Mfg. Co.: Saved enough in polishing cost to avoid price increases—despite increased labor and material costs. Reports Formbrite fabricates almost as readily as the softest drawing brass . . . uniformity of gage in Formbrite has simplified manufacture.

Find out for yourself how Formbrite can serve you as a short cut—save you money. See your American Brass Company representative. Write for Publication B-39. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5587

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Nonferrous Metals

Zinc statistics show drop of 12,191 tons in unfilled orders, but market undertone remains firm. Automotive cutbacks allow producers to develop new markets

Nonferrous Metal Prices, Pages 168 & 169

ZINC production dropped slightly from a December peak of 92,578 tons to 90,313 tons in January, reports the American Zinc Institute. The January total a year ago was 86,076 tons.

Demand Lessening? — Stocks remained virtually the same as the previous month (40,979 vs. 41,330), but unfilled orders plunged from 72,908 tons in December to 60,717 tons. Shipments managed to gain, rising to 89,962 tons. December shipments totaled 89,657.

There is no cause for concern, say industry spokesmen. They point out that the government's willingness to enter the market for zinc and lead is providing a firm floor. And automotive cutbacks are giving primary producers an opportunity to catch up and develop new sales areas.

Andrew Fletcher, president of St. Joseph Lead Co., doesn't think there will be much of a lull at all. "We expect that despite a probable decline in automobile production in 1956, there will be sufficient growth in other zinc consuming industries, notably galvanizing, that will compensate for any loss, leaving us in approximately the same position we have enjoyed this past year."

Meanwhile—The lead market is firm. While there is less activity, most producers are selling larger quantities than they did a year ago. Consensus: Zinc and lead demand is good, but not phenomenal. Prices could stay at this level for some time as both metals remain in good supply. Settlement of the dock workers strike in Australia, one of the large world producers, should help stabilize prices.

Copper Strike Ends

The copper industry breathed a sigh of relief last week as the management of the Laurel Hill refinery (Phelps Dodge) and the United Steel Workers union came to terms. Starting out as a minor walkout (Jan. 10), the Laurel Hill strike turned into a major cause for alarm as some 15,000 tons of production were lost.

The dust had just begun to settle when the Nevada Mines Division, Kennecott Copper Corp., was hit by a strike. The workers were protesting time and efficiency studies which were being conducted on oilers at the mill. Fortunately, it turned out to be a "quickie." By Monday, Feb. 13, the workers had returned to their jobs.

Army Wants Lighter Equipment

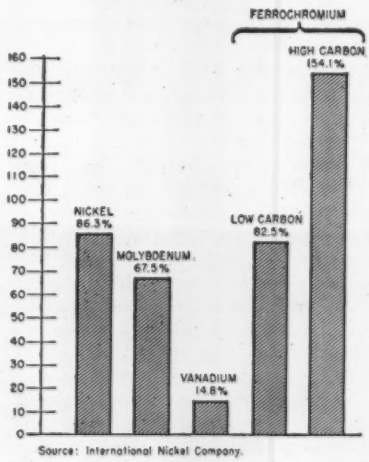
Gen. Maxwell Taylor, Army chief of staff, is spearheading a new drive for the development of light metals and materials. His aim: To provide the army with more firepower and greater mobility. Of particular interest in the nonferrous field is the use of aluminum, magnesium and titanium. First move may be to produce aluminum jeeps. Titanium research may be a bit slow because of the metal's cost and scarcity.

Tin Agreement Under Way

The International Tin Agreement will go into effect within the next two or three months. An organization will have to be set up in London to administer a "buffer stock" of tin. The agreement says that no country can give more than 75 per cent of its commitment in tin. Theoretically, this leaves a loophole: It says nothing about a country which wants to give its entire share in currency rather than tin and money. With the current tight supply situation, many would rather give money. But there may be a solution on the horizon. The Texas City tin smelter is taking excess supplies of tin from the world market. It is slated to close in June. If this happens, there would be more than enough tin available to set up the buffer organization. With the surplus tin being placed on the market in one bundle, prices would dip to a point where the organization's buyer would be permitted to purchase for the buffer pool. Setting up the tin buying and selling organization at this time may well solve the problem of having too much tin on the market in June.

Increase in Prices of Alloying Elements

(1936-1938 = 100)



Source: International Nickel Company.

Market Memos

• A new aluminum casting alloy has been developed by Alcoa to replace its older automotive piston alloy D132 which has a nickel content ranging from 0.5 to 1.5 per cent. The new alloy (F132) has a maximum nickel content of 0.5 per cent.

• How does a change in style affect a metal? The extensive "bright" work on cars has required the use of large quantities of nickel as an undercoating for the chromium plating of steel, zinc or aluminum. Dictated by style, there is a trend toward reducing the amount of bright work. While this is caused in some degree by the shortage of nickel, the development of anodized aluminum is a fast growing threat to nickel in the automotive industry. But nickel producers are busy. They are conducting research programs aimed at improving nickel plating and are searching for new uses which could replace any markets which may be lost.

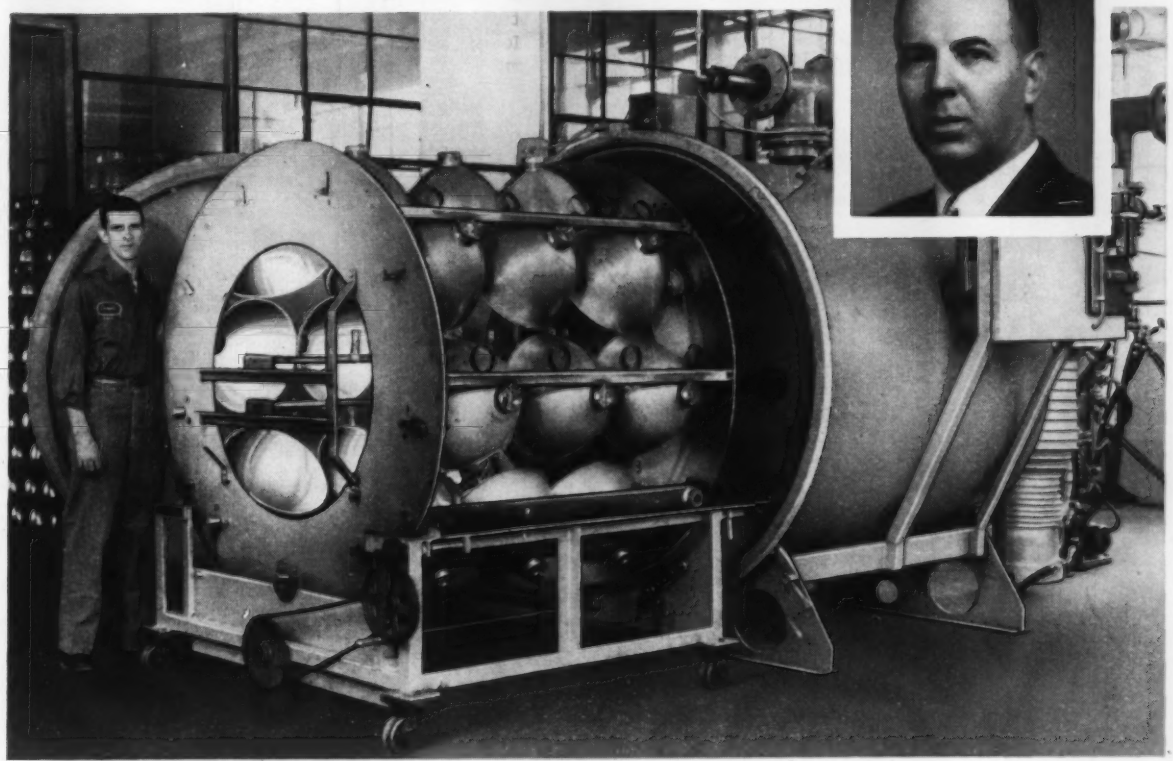
• The General Services Administration has issued a progress report on its program to purchase scarce materials. The Deming, N. Mex., depot was closed in November, says GSA, because its 6-million-ton goal for manganese was reached. Tungsten is approaching its goal. Some 2.4 million short ton units have been delivered. The goal is 3 million units. Chrome purchases are at the halfway mark. Some 100,000 tons have been delivered to the government. The report includes purchases through Dec. 31, 1955.

"Our Reflector Finishing Costs Dropped from $4.00 each to 95¢ each

WHEN WE CHANGED FROM ELECTRO-PLATING TO VACUUM COATING"

states

Mr. Elwood C. Rogers
President
Elwood Pattern Works, Inc.
125 N. East Street
Indianapolis, Indiana



NRC "Rapid Cycle" Vacuum Coater used to produce a new lower cost, higher quality finish on enlarger reflectors by Elwood Pattern Works, Inc., one of the country's leading photo enlarger manufacturer.

Other comments made by Mr. Rogers about the benefits resulting from his NRC "Rapid Cycle" Vacuum Coater:

"Customers are enthusiastic" . . .

". . . has eliminated all our troubles".

". . . gave us a reflector that would not tarnish or be affected by the heat".

"Our figures show this unit repays its total initial cost in less than 5 months".

You'll find NRC Vacuum Coaters have other important production advantages. They are easier to load . . . safeguarded from operator errors . . . faster to operate . . . less costly to maintain.

We have had years of experience in making and operating vacuum coaters. We can help you on all the problems involved in setting up a vacuum coating production unit — the size of the coater, method of loading, selection of lacquers, type of coating, and many others.

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 24.40; pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 52.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99% +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50. AZ91B, 31.00, Madison, Ill.

Mercury: Open market, spot, New York, $270-$274 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom. per troy oz.

Palladium: $23-$24 per troy oz.

Platinum: $97-$111 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $15-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 100.625; prompt, 100.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.30 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 30.75-32.75; No. 12 foundry alloy (No. 2 grade) 29.50-29.75; 5% silicon alloy, 0.60 Cu max, 31.00-31.25; 13 alloy, 0.60 Cu max, 31.00-31.25; 195 alloy, 31.00-31.25; 108 alloy, 29.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.25-30.75; grade 2, 29.25; grade 3, 28.50; grade 4, 28.00-29.00.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.35-48.48; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.03-46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00-24.00; ribbon zinc in coils, 21.50; plates, 20.00-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99.00; 0.064 in., 78.00; 0.125 in., 63.50, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in., tread plate, 61.00, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70; 1 x 4 in., 69.50. Rod, 1 in., 61.50; 2 in., 59.00. Tubing, 1 in. OD x 0.065 in., 82.50. Angles, 1 x 1 x ⅛-in., 68.40; 2 x 2 x ¼-in., 62.50. Channels, 5 in., 63.40. I-beams, 5 in., 62.70.

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 20.50-21.00; old sheets, 17.00-17.50; borings and turnings, 11.00-11.50; crankcases, 17.00-17.50; industrial castings, 17.00-17.50.

Copper and Brass: No. 1 heavy copper and wire, 41.00-41.50; No. 2 heavy copper and wire, 37.00-37.50; light copper, 34.50-35.00; No. 1 composition red brass, 31.50-32.00; No. 1 composition turnings, 30.50-31.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a			SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	64.13b	61.36c	....	64.32	39.000	39.000	38.250
Yellow Brass	53.60	43.80d	54.14	56.51	29.250	29.000	27.125
Low Brass, 80%	57.75	57.69	58.29	60.56	33.000	32.750	32.250
Red Brass, 85%	59.24	59.18	59.78	62.05	34.375	34.125	33.625
Com. Bronze, 90%	61.28	61.22	61.82	63.84	35.750	35.500	35.000
Manganese Bronze	60.84-60.92	54.86-54.96	65.32	....	27.500	27.250	26.750
Muntz Metal	55.14	50.95	....	....	27.375	27.125	26.625
Naval Brass	57.10	51.41	64.16	60.26	27.125	26.875	26.375
Silicon Bronze	67.54	65.73	67.58	69.68e	37.875	37.625	37.875
Nickel Silver, 10%	67.25	69.58g	69.58	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	82.52	83.02	83.02	84.20	39.750	39.500	38.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

Brass turnings, 16.50-17.00; new brass clippings, 27.50-28.00; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.00-26.50; auto radiators, unsweated, 24.00-24.50; cocks and faucets, 24.50-25.00; brass pipe 25.00-25.50.

Lead: Heavy, 12.75-13.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 60.00-65.00; old sheets, 55.00-65.00; turnings, 50.00; rods, 59.50-65.00.

Nickel: Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

Zinc: Old zinc, 6.00-6.50; new die-cast scrap, 6.00; old die-cast scrap, 3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 23.00; 3003 clippings, 22.75-23.00; 6151 clippings, 22.50-23.00; 5052 clippings, 22.50-23.00; 2014 clippings, 22.00-22.50; 2017 clippings 22.00-22.50; 2024 clippings, 22.00-22.50; mixed clippings, 22.00-22.50; old sheet, 19.00-20.00; old cast, 18.50-19.50; clean old cable (free of steel), 22.50; borings and turnings, 20.00-21.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00-39.00.

Copper and Brass: No. 1 heavy copper and wire, 42.50; No. 2 heavy copper and wire, 41.00; light copper 38.75; refinery brass (60% copper) per dry copper content, 38.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 42.50; No. 2 heavy copper and wire, 41.00; light copper 38.75; No. 1 composition borings, 33.00; No. 1 composition solids, 34.00; heavy yellow brass solids, 23.00; yellow brass turnings, 22.00; radiators, 26.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 60.79; oval 59.92, 5000-10,000 lb; electrodeposited, 57.75, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab; less than 200 lb, $1.195; 200-499 lb, $1.180; 500-999 lb, $1.175; 1000 lb or more, $1.170.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 71.90; 100-600 lb, 63.40; 700-1900 lb, 60.90; 2000-9900 lb, 59.20; 10,000 lb or more, 58.00.

Stannous Chloride (anhydrous): Less than 25 lb, $1.690; 25 lb, $1.340; 100 lb, $1.190; 400 lb, $1.165; 5200-19,600 lb, $1.043; 20,000 lb or more, 92.10.

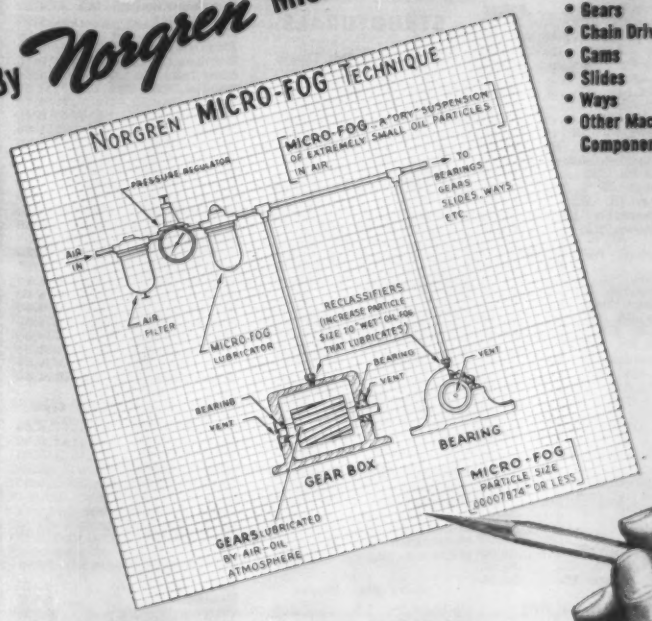
Stannous Sulphate: Less than 50 lb, $1.316; 50 lb, $1.016; 100-1900 lb, 99.60; 2000 lb or more, 97.60.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

MACHINE WEAR REDUCED TO A MINIMUM

By Norgren MICRO-FOG Lubrication

For
- Bearings
- Gears
- Chain Drives
- Cams
- Slides
- Ways
- Other Machine Components

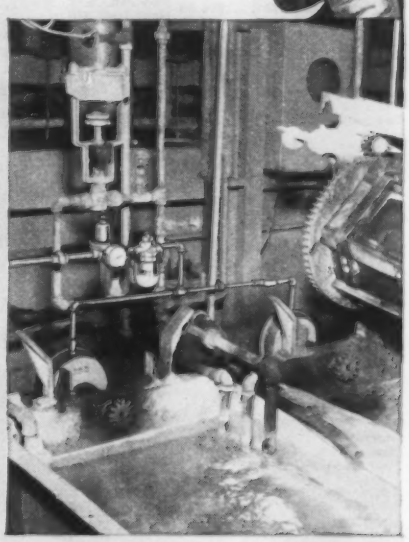


Norgren MICRO-FOG Ends Gear Lubrication Problem On Zinc Plating Tanks

At the Wagner Electric Corp., St. Louis, baskets containing parts to be zinc plated in a hot acid solution are mechanically agitated by a gear drive.

With the former drip feed lubrication method, acid fumes entered the gear boxes, contaminating the lubricant and destroying the gear box seals. Loss of lubricant plus corrosion by the contaminated lubricant greatly accelerated gear wear and resulted in frequent costly repairs.

Three years ago, the Norgren MICRO-FOG Lubrication System at right was installed. The gears are constantly protected from wear by a film of oil — and entry of acid fumes is prevented by the slight, continuous flow of air through the gear box, venting to the atmosphere. Gear wear and corrosion have been reduced to a minimum.



C.A. Norgren CO.

So. Elati, Englewood, Colo.

Write for
FREE BLUEPRINT MF-21
for complete details on this application — or call your nearby Norgren Representative listed in your telephone book.

PRESSURE REGULATORS • AIR LINE FILTERS • LUBRICATORS • AIR CONTROL VALVES

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 171. Key to footnotes, page 173.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$65.50

INGOTS, Alloy (NT)

Detroit R7 ....$69.00
Houston S5 ....74.00
Midland,Pa. C18 ....69.00
Munhall,Pa. U5 ....69.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 ....68.50
Clairton,Pa. U5 ....68.50
Ensley,Ala. T2 ....68.50
Fairfield,Ala. T2 ....68.50
Fontana,Calif. K1 ....76.00
Gary,Ind. U5 ....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall,Pa. U5 ....68.50
Pittsburgh J5 ....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ....68.50
Youngstown R2 ....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 ....84.50
Bridgeport,Conn. N19 ..89.50
Buffalo R2 ....84.50
Canton,O. R2 ....86.50
Clairton,Pa. U5 ....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 ....84.50
Fairfield,Ala. T2 ....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 ....84.50
Geneva,Utah C11 ....84.50
Houston S5 ....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2...84.50
LosAngeles B3 ....94.00
Midland,Pa. C18 ....84.50
Munhall,Pa. U5 ....84.50
Pittsburgh J5 ....84.50
Seattle B3 ....98.00
S.Chicago R2,U5,W14 ..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$96.00
Buffalo R2 ....96.00
Canton,O. R2, T7 ....96.00
Conshohocken,Pa. A3..103.00
Detroit R7 ....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 ....96.00
Houston S5 ....101.00
Ind.Harbor,Ind. Y1 ....96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....116.00
Massillon,O. R2 ....96.00
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ....96.00
Struthers,O. Y1 ....96.00
Warren,O. C17 ....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$103.50
Canton,O. R2 ....103.50
Cleveland R2 ....103.50
Gary,Ind. U5 ....103.50
S.Chicago R2, W14 ..103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 ....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 ....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.375
Aliquippa,Pa. J5 ....5.375
Alton,Ill. L1 ....5.55
Buffalo W12 ....5.375
Cleveland A7 ....5.375
Donora,Pa. A7 ....5.375
Fairfield,Ala. T2 ....5.375
Houston S5 ....5.625
IndianaHarbor,Ind. Y1..5.375
Johnstown,Pa. B2 ....5.375
Joliet,Ill. A7 ....5.375
KansasCity,Mo. S5 ....5.625
Kokomo,Ind. C16 ....5.475
LosAngeles B3 ....6.175
Minnequa,Colo. C10 ...5.625
Monessen,Pa. P7 ....5.375
N.Tonawanda,N.Y. B11 5.375
Pittsburg,Calif. C11 ...5.675
Portsmouth,O. P12 ....5.375
Roebling,N.J. R5 ....5.475
S.Chicago,Ill. R2 ....5.375
SparrowsPoint,Md. B2..5.475
Sterling,Ill.(1) N15 ....5.375
Sterling,Ill. N15 ....5.475
Struthers,O. Y1 ....5.375
Worcester,Mass. A7 ...5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ....4.60
Aliquippa,Pa. J5 ....4.60
Bessemer,Ala. T2 ....4.60
Bethlehem,Pa. B2 ....4.65
Birmingham C15 ....5.10
Clairton,Pa. U5 ....4.60
Fairfield,Ala. T2 ....4.60
Fontana,Calif. K1 ....5.25
Gary,Ind. U5 ....4.60
Geneva,Utah C11 ....4.60
Houston S5 ....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 ....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 ....4.60
Niles,Calif. P1 ....5.25
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 ....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 ....4.65
Clairton,Pa. U5 ....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 ....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 ....4.60

Alloy Std. Shapes

Clairton,Pa. U5 ....5.65
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 ....5.65
Houston S5 ....5.75
Munhall,Pa. U5 ....5.65
S.Chicago,Ill. U5 ....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ....6.75
Bessemer,Ala. T2 ....6.75
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.75
Fairfield,Ala. T2 ....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 ....6.75
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 ....7.45
Munhall,Pa. U5 ....6.75
Seattle B3 ....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 ....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 ....6.75
S.Chicago,Ill. U5 ....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....4.65
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 ....4.60
S.Chicago,Ill. U5 ....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 ....5.45
S.Chicago,Ill. U5 ....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ....4.50
Aliquippa,Pa. J5 ....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 ....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 ....4.50
Clairton,Pa. U5 ....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 ....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ...4.50
Detroit M1 ....4.60
Ecorse,Mich. G5 ....4.60
Fairfield,Ala. T2 ....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 ....4.50
Geneva,Utah C11 ....4.50
GraniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 ....5.10
Houston S5 ....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 ....4.50
Lackawanna,N.Y. B2 ...4.50
LoneStar,Tex. L6 ....4.85
Mansfield,O. E6 ....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 ....4.50
Newport,Ky. N9 ....4.50
Pittsburgh J5 ....4.50
Riverdale,Ill. A1 ....4.725
Seattle B3 ....5.40
Sharon,Pa. S3 ....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 ....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....5.65
Fontana,Calif. K1 ....6.30
Geneva,Utah C11 ....5.65
Johnstown,Pa. B2 ....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.725
Bessemer,Ala. T2 ....6.725
Clairton,Pa. U5 ....6.725
Cleveland J5, R2 ....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....7.025
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 ....6.825
Fairfield,Ala. T2 ....6.725
Fontana,Calif.(30) K1..7.375
Gary,Ind. U5 ....6.725
Geneva,Utah C11 ....6.725
Houston S5 ....6.825
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
Munhall,Pa. U5 ....6.725
Pittsburgh J5 ....6.725
Seattle B3 ....7.625
Sharon,Pa. S3 ....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 ....6.30
Houston S5 ....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 ....6.30
Munhall,Pa. U5 ....6.30
Newport,Ky. N9 ....6.30
Seattle B3 ....7.20
Sharon,Pa. S3 ....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 ....6.30

FLOOR PLATES

Cleveland J5 ....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 ....5.575
S.Chicago,Ill. U5 ....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 ....5.10
Warren,O. c.l. R2 ....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala.(9) R2 ....4.65
Aliquippa,Pa.(9) J5 ....4.65
Alton,Ill. L1 ....4.85
Atlanta A11 ....4.85
Bessemer,Ala.(9) T2 ...4.65
Birmingham C15 ....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo(9) R2 ....4.65
Canton,O.(9) R2 ....4.75
Clairton,Pa.(9) U5 ....4.65
Cleveland(9) R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala.(9) T2 ....4.65
FairlessHills,Pa.(9) U5..4.80
Fontana,Calif. K1 ....5.35
Gary,Ind.(9) U5 ....4.65
Houston(9) S5 ....4.90
Ind.Harbor,Ind.(9) I-2..4.65
Ind.Harbor,Ind. Y1 ....4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 ....5.15
KansasCity,Mo.(9) S5 ..4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 ....5.35
Massillon,O.(9) R2 ....4.75
Midland,Pa. C18 ....4.65
Milton,Pa. M18 ....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.35
N.T'wanda,N.Y.(9) B11 4.65
Pittsburg,Calif.(9) C11..5.35
Pittsburgh(9) J5 ....4.65
Portland,Oreg. O4 ....5.40
Seattle B3, N14 ....5.40
S.Chicago W14 ....4.65
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5...4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif.(9) C11 ..5.35
Warren,O.(9) R2 ....4.65
Weirton,W.Va.(9) W6 ..4.65
Youngstown(9) R2 U5..4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19..5.725
Buffalo R2 ....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 ....5.575
Detroit R7 ....5.575
Ecorse,Mich. G5 ....5.675
Fontana,Calif. K1 ....6.625
FairlessHills,Pa. U5 ...5.725
Gary,Ind. U5 ....5.575
Houston S5 ....5.825
Ind.Harbor,Ind. I-2, Y1..5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 ....6.625
Massillon,O. R2 ....5.575
Midland,Pa. C18 ....5.575
S.Chicago R2, U5, W14..5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 ....5.575
Warren,O. C17 ....5.575
Youngstown U5 ....5.575

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.80
Bessemer,Ala. T2 ....6.80
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.80
Cleveland R2 ....6.80
Ecorse,Mich. G5 ....6.90
Fairfield,Ala. T2 ....6.80
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
Ind.Harb.,Ind. I-2, Y1..6.80
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 ....7.50
Pittsburgh J5 ....6.80
Seattle B3 ....7.55
S.Chicago W14 ....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 ....6.80
Warren,O. R2 ....6.80
Youngstown U5 ....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ....4.65
Atlanta A11 ....4.85
Fontana,Calif. K1 ....5.35
Joliet,Ill. P22 ....5.10
Niles,Calif. P1 ....5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
SanFrancisco S7 ....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ....5.65
Gary,Ind. U5 ....5.65
Houston S5 ....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 ....5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 ....8.35
Chicago W18 ....8.325
Cleveland C20 ....8.325
Monaca,Pa. S17 ....8.325
Newark,N.J. W18 ....8.50
SpringCity,Pa. K3 ....8.30
Warren,O. C17 ....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.25*
BeaverFalls,Pa. M12,R2 6.25*
Buffalo B5 ....6.30*
Camden,N.J. P13 ....6.70*
Carnegie,Pa. C12 ....6.25*
Chicago W18 ....6.25*
Cleveland A7, C20 ....6.25*
Detroit B5 ....6.45*
Detroit P17, R7 ....6.25*
Donora,Pa. A7 ....6.25*
Elyria,O. W8 ....6.25*
FranklinPark,Ill. N5 ...6.25*
Gary,Ind. R2 ....6.25*
GreenBay,Wis. F7 ....6.25*
Hammond,Ind. L2, M13..6.25*
Hartford,Conn. R2 ....6.75*
Harvey,Ill. B5 ....6.25*
LosAngeles(49) S30 ....7.70*
LosAngeles R2 ....7.70*
Mansfield,Mass. B5 ....6.80*
Massillon,O. R2, R8 ...6.25*
Midland,Pa. C18 ....6.25*
Monaca,Pa. S17 ....6.25*
Newark,N.J. W18 ....6.70*
NewCastle,Pa.(17) B4..6.25*
Pittsburgh J5 ....6.25*
Plymouth,Mich. P5 ....6.50*
Putnam,Conn. W18 ....6.80*
Readville,Mass. C14 ...6.80*
S.Chicago,Ill. W14 ....6.25*
SpringCity,Pa. W3 ....6.70*
Struthers,O. Y1 ....6.25*
Waukegan,Ill. A7 ....6.25*
Worcester,Mass. W19 ..6.70*
Youngstown F3, Y1 ...6.25*

*Including 0.35c for special quality.

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19. 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ...7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 ....7.425
Buffalo B5 ....7.425
Camden,N.J. P13 ....7.60
Canton,O. T7 ....7.425
Carnegie,Pa. C12 ....7.425
Chicago W18 ....7.425
Cleveland A7, C20 ....7.425
Detroit R7 ....7.425
Detroit B5, P17 ....7.625
Donora,Pa. A7 ....7.425
Elyria,O. W8 ....7.425
Gary,Ind. R2 ....7.425
GreenBay,Wis. F7 ....7.425
Hammond,Ind. L2, M13..7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 ....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 ....9.10
Mansfield,Mass. B5 ...7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 ....7.425
Monaca,Pa. S17 ....7.425
Newark,N.J. W18 ....7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 ....7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 ....7.425
Warren,O. C17 ....7.425
Waukegan,Ill. A7 ....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing
(To Fabricators)

Ala.City,Ala. R2 ....4.65
Atlanta A11 ....4.85
Birmingham C15 ....5.15
Buffalo R2 ....4.65
Cleveland R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ...5.40
Fairfield,Ala. T2 ....4.65
FairlessHills,Pa. U5 ...4.80
Fontana,Calif. K1 ....5.35
Ft.Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 ....4.65
Houston S5 ....4.90

Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ...5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 .....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1.4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ...6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2...6.15
Williamsport,Pa. S19 ...6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4...5.10
Franklin,Pa.(3) F5 .....4.65
Franklin,Pa.(4) F5 .....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14, 14.65
McK.Rks. (S.R.) L5 ..11.50
McK.Rks. (D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 .....7.125
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2....4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ..5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport, Ky. N9 .....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ...7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ...7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ..6.60*
SparrowsPt.,Md. B2 ..5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 .....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft.HowardSteel&Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel&Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&WireCo.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md.Pine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel&Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel&Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 YoungstownSheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2,Y1.4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ...5.425
Pittsburg,Calif. C11 ...5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
SanFrancisco S7 .....5.05
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3.5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance:Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.425
Conshohocken,Pa. A3 ..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1.6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3.7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ...6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland A7, J5 .....6.25
Conshohocken,Pa. A3 ..6.30
Dearborn,Mich. D3 .....6.35
Detroit D2, M1, P20....6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ...6.25
Fontana,Calif. K1 .....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ..6.25
LosAngeles C1 .....8.30
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ....6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7, D2 6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 ....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 ....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ....6.25
Trenton,N.J.(31) R5 ...7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 .....6.25
Weirton,W.Va. W6 ....6.25
Worcester,Mass. A7 ....6.80
Youngstown C8, Y1 ....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 ....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ....13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20
Ind.Harbor,Ind. Y1 ....9.30

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
NewYork W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Youngstown C8	...	...	15.00	18.35	22.35

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.55

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.05
Riverdale,Ill. A1 .....4.90
Sharon,Pa. S3 .....4.75
Youngstown U5 .....4.75

STRIP, Electrogalvanized

Cleveland A7 .....6.25*
Dover,O. G6 .....6.25*
Riverdale,Ill. A1 .....6.35*
Youngstown C8 .....6.25*
Warren,O. T5 .....6.25*
Warren,O. B9 .....6.45*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ...6.80*

*Plus galvanizing extras.

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60‡
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

	Grain Oriented					
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed. semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1.	9.20	9.45
Pitts.,Calif. C11.	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10.	9.20	9.45

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.00
Dravosburg,Pa. U5 ....7.00
Fairfield,Ala. T2 .....7.10
FairlessHills,Pa. U5 ....7.10
Gary,Ind. U5 .....7.00
GraniteCity,Ill. G4 ....7.10
Ind.Harbor,Ind. I-2, Y1.7.00
Niles,O. R2 .....7.00
Pittsburg,Calif. C11 ....7.75
SparrowsPoint,Md. B2.. 7.10
Warren,O. R2 .....7.00
Weirton,W.Va. W6 .....7.00
Yorkville,O. W10 .....7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 ....6.65
Gary,Ind. U5 .....6.65
GraniteCity,Ill. G4 .....6.75
Ind.Harbor,Ind. Y1 ....6.65
Yorkville,O. W10 .....6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5 ....$8.70
Gary,Ind. U5 .....8.70
Yorkville,O. W10 .....8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5 .....$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.60
Aliquippa,Pa. J5 .....6.60
Alton,Ill. L1 .....6.775
Atlanta A11 .....6.80
Bartonville,Ill. K4 .....6.35
Buffalo W12 .....6.60
Chicago W13 .....6.60
Cleveland A7 .....6.60
Crawfordsville,Ind. M8..6.70
Donora,Pa. A7 .....6.60
Duluth,Minn. A7 .....6.60
Fairfield,Ala. T2 .....6.60
Fostoria,O.(24) S1 .....6.80
Houston S5 .....6.85
Jacksonville,Fla. M8 ...6.95
Johnstown,Pa. B2 .....6.60
Joliet,Ill. A7 .....6.60
KansasCity,Mo. S5 ....6.85
Kokomo,Ind. C16 .....6.70
LosAngeles B3 .....7.55
Minnequa,Colo. C10 ....6.85
Monessen,Pa. P7 .....6.60
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.60
Palmer,Mass. W12 .....6.90
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.60
Rankin,Pa. A7 .....6.60
S.Chicago,Ill. R2 .....6.60
S.SanFrancisco C10 .....7.55
SparrowsPoint,Md. B2 ..6.70
Sterling,Ill.(1) N15 .....6.60
Sterling,Ill. N15 .....6.70
Struthers,O. Y1 .....6.60
Waukegan,Ill. A7 .....6.60
Worcester,Mass. A7 ....6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 .....8.20
Pittsburg,Calif. C11 ....8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ...8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 ....7.85
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ...7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ...7.90
Palmer,Mass. W12 .....7.90
Pittsburg,Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
S.Chicago,Ill. R2 .....7.60
S.SanFrancisco C10 ....8.55
SparrowsPoint,Md. B2 ..7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 ....7.90

WIRE, Fine & Weaving (8"Coils)

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ..12.90
Johnstown,Pa. B2 .....12.55
Kokomo,Ind. C16 .....12.55
Minnequa,Colo. C10 ....12.30
Monessen,Pa. P6 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
S.SanFrancisco C10 ....12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. A7.T6.12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2 .....10.70
Minnequa,Colo. C10 ..10.825
Monessen,Pa. P16 .....10.70
Muncie,Ind. I-7 .....10.90
Pittsburg,Calif. C11 ...11.50
Portsmouth,O. P12 .....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ...10.80
Struthers,O. Y1 .....10.70

ROPE WIRE (A)

Bartonville,Ill. K4 ....10.55
Buffalo W12 .....10.55
Fostoria,O. S1 .....10.55
Johnstown,Pa. B2 .....10.55
Monessen,Pa. P16 .....10.55
Muncie,Ind. I-7 .....10.75
Palmer,Mass. W12 .....10.85
Portsmouth,O. P12 .....10.55
Roebling,N.J. R5 .....10.85
SparrowsPt. B2 .....10.65
Struthers,O. Y1 .....10.55
Worcester,Mass. J4 .....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Cont.nued)

WIRE, Tire Bead

Bartonville,Ill. K4 ....14.15
Monessen,Pa. P16 ....14.20
Roebling,N.J. R5 ....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....9.00
Baltimore T6 .....9.30
Buffalo W12 .....9.00
Cleveland A7 .....9.00
Crawfordsville,Ind. MS..9.00
Dover,O. G6 .....9.00
Fostoria,O. S1 .....9.00
FranklinPark,Ill. T6 ....9.10
Kokomo,Ind. C16 .....9.00
Massillon,O. R8 .....9.00
Milwaukee C23 .....9.20
Monessen,Pa. P16 .....9.00
Pawtucket,R.I. N8 .....9.30
Riverdale,Ill. A1 .....9.10
Rome,N.Y. R6 .....9.00
Trenton,N.J. R5 .....9.30
Worcester A7, T6, W12..9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. MS	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(23)	MS...162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa.	A3...$9.05
Wheeling,W.Va. W10	..9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind.	MS..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(23)	MS...162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2..$9.35
Bartonville,Ill. K4 .....9.45
Buffalo W12 .....9.35
Crawfordsville,Ind. MS..9.45
Donora,Pa. A7 .....9.35
Duluth,Minn. A7 .....9.35
Jacksonville,Fla. MS 9.88
Johnstown,Pa. B2 .....9.35
Joliet,Ill. A7 .....9.35
Kokomo,Ind. C16 .....9.45
LosAngeles B3 .....10.14
Minnequa,Colo. C10 ....9.60
Pittsburg,Calif. C11 ...10.13
S.Chicago,Ill. R2 .....9.35
SparrowsPt.,Md. B2 ....9.45
Sterling,Ill. N15 .....9.35

Coil No. 6500 Stand.

AlabamaCity,Ala. R2..$9.65
Bartonville,Ill. K4 ....9.75
Buffalo W12 .....9.65
Crawfordsville,Ind. MS..9.75
Donora,Pa. A7 .....9.65
Duluth,Minn. A7 .....9.65
Jacksonville,Fla. MS ...10.18
Johnstown,Pa. B3 .....9.65
Joliet,Ill. A7 .....9.65
Kokomo,Ind. C16 .....9.75
LosAngeles B3 .....10.45
Minnequa,Colo. C10 ...9.90
Pittsburg,Calif. C11 ...10.45
S.Chicago,Ill. R2 .....9.65
SparrowsPt.,Md. B2 ....9.75
Sterling,Ill. N15 .....9.65

Coil No. 6500 Interim

AlabamaCity,Ala. R2 ..$9.70
Bartonville,Ill. K4 .....9.80
Buffalo W12 .....9.70
Crawfordsville,Ind. MS..9.80
Donora,Pa. A7 .....9.70
Duluth,Minn. A7 .....9.70
Jacksonville,Fla. MS ...10.23
Johnstown,Pa. B2 .....9.70
Joliet,Ill. A7 .....9.70
Kokomo,Ind. C16 .....9.80
LosAngeles B3 .....10.50
Minnequa,Colo. C10 ....9.95
Pittsburg,Calif. C11 ...10.50
S.Chicago,Ill. R2 .....9.70
SparrowsPt.,Md. B2 ....9.80
Sterling,Ill. N15 .....9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..175**
Aliquippa,Pa. J5	.....172‡
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. MS	..181
Donora,Pa. A7	.....175†
Duluth,Minn. A7	.....175†
Fairfield,Ala. T2	.....175†
Houston,Tex. S5	.....180**
Jacksonville,Fla. MS	...186
Johnstown,Pa. B2	....179*
Joliet,Ill. A7	.....175†
KansasCity,Mo. S5	....180**
Kokomo,Ind. C16	.....177†
Minnequa,Colo. C10	...180**
Monessen,Pa. P7	....178††
Pittsburg,Calif. C11	....195†
Rankin,Pa. A7	.....175†
S.Chicago,Ill. R2	....175**
S.SanFrancisco C10	...195**
SparrowsPoint,Md. B2	..181*
Sterling,Ill.(1) N15	....179††

WOVEN Fence, 9-15 ga.

	Col.
Ala.City,Ala. R2	..162**
Ala.City, 17 ga. R2	...257**
Ala.City, 18 ga. R2	...267**
Aliq'ppa,Pa.9-14½ga J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. MS	..168
Donora,Pa. A7	.....162†
Duluth,Minn. A7	.....162†
Fairfield,Ala. T2	.....162†
Houston,Tex. S5	.....167**
Jacksonville,Fla. MS	...173
Johnstown,Pa.(43) B2	..166
Joliet,Ill. A7	.....162†
KansasCity,Mo. S5	....167**
Kokomo,Ind. C16	.....164†
Minnequa,Colo. C10	...167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	....185†
Rankin,Pa. A7	.....162†
S.Chicago,Ill. R2	....162**
Sterling,Ill.(1) N15	....166††

WIRE (16 Gage)

	An'ld Stone	Galv. Stone
Ala.City R2	...14.50	16.05**
Bartonville K4	..14.50	16.55
Buffalo W12	....14.50	....
Cleveland A7	....14.50	....
Crawf'dsville	MS.14.60	16.55
Fostoria,O. S1	..14.60	16.15†
Jacksonville	MS..14.85	16.80
Johnstown B2	..14.50	16.40*
Kokomo C16	..14.60	16.15†
Minnequa C10	..14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	..14.85	16.40†
S.Chicago R2	..14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	..14.50	16.05†
Worcester A7	...14.80	....

WIRE, Merchant Quality

(6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala.	R2.7.40	7.80**
Aliquippa J5	....7.40	7.925‡
Atlanta A11	.....7.50	8.10
Bartonville(48)	K4 7.50	8.10
Buffalo	W12 ....7.40	8.80†
Cleveland A7	....7.40	....
Crawfordsville	MS..7.50	8.10
Donora,Pa. A7	...7.40	7.80†
Duluth,Minn. A7	..7.40	7.80†
Fairfield T2	.....7.40	7.80†
Houston(48)	S5..7.65	8.05**
Jacks'ville,Fla.	MS 7.75	8.35
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	....7.40	7.80†
Kans.City(48)	S5 7.65	8.05**
Kokomo C16	....7.50	7.90†
LosAngeles B3	..8.35	8.925*
Minnequa C10	...7.65	8.05**
Monessen P7(48)	.7.40	8.00††
Palmer,Mass.	W12 7.70	8.10†
Pitts.,Calif. C11	..8.35	8.75†
Portsmouth,O.	P12 7.40	....
Rankin A7	.....7.40	7.80†
S.Chicago R2	...7.40	7.80**
S.SanFran. C10	..8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ling(1)(48)	N15 7.40	8.00††
Struthers,O.(48)	Y1 7.40	7.90‡
Worcester,Mass.	A7 7.70	....

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
†½" x 6" and smaller 61
Larger than ½" diam. and all diams. longer than 6" 55
Under-Size Body (rolled thread; not nutted); ⅜" x 6" and smaller. 61

†½" x 4" and smaller and shorter are not nutted.

NUTS

Reg. & Heavy Square Nuts, all sizes 61

H. P. Reg. & Heavy Hex Nuts:

¾" & smaller 64
⅞" to 1⅛" incl. 63
1¼" to 1½" incl. 65
1⅝" & larger 61

C.P. Reg. & Heavy Hex Nuts

¾" & smaller 64
⅞" & larger 61

Semifinished & Finished Nuts

¾" & smaller 66
⅞" & larger 63

Semifin.shed Slotted Reg. & Heavy Hex Nuts

¾" & smaller 66
⅞" & larger 63

Hot Galvanized Nuts, all types

1½" & smaller 44
(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:

6" and shorter:
¼" through ½" diam. 34
⅝" & ⅝" diam. 31
¾", ⅞", 1" 8
Longer than 6"
¼" through ⅝" diam. 3
¾" through 1" diam. . +13

High Carbon, Heat-treated:

6" and shorter:
¼" through ½" diam. 20
⅝" & ⅝" diam. 16
¾", ⅞", 1" ..... +11
Longer than 6"
¼" through ⅝" diam. +23
¾" through 1" diam. . +41
(New Std. Hexagon head, upset, bulk).

Bright:

½" x 6" & smaller & shorter 49
⅝" & ⅝" diam. x 6" & shorter 48
¾", ⅞", 1" x 6" & shorter 31

High Carbon, Heat-treated:

½" x 6" & smaller & shorter 41
⅝" x ⅝" diam. & 6" & shorter 39
¾", ⅞", 1" x 6" & shorter 20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅜" incl., Square:
25,000 to 199,999 pieces 20
200,000 or more pieces 27
No. 2 to ⅜" incl., Hex.:
25,000 to 199,999 pieces 18
200,000 or more pieces 25

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:
25,000 to 199,999 pieces 20
200,000 or more pieces 27
⅝" to ½" diam. incl.:
15,000 to 99,999 pieces 20
100,000 or more 27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
3	12	45.00	53.22	43.65
	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...(16)‡	5.65
Lackawanna,N.Y. B2	4.725	4.625	...(16)‡	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2 ....5.625
Gary,Ind. U5 .....5.625
Ind.Harbor,Ind. I-2 ...5.625
Lackawanna,N.Y. B2..5.625
Minnequa,Colo. C10 ...5.625
Seattle B3 .....5.775
Steelton,Pa. B2 .....5.625
Torrance,Calif. C11 ...5.775

TRACK BOLTS (20) Treated

Cleveland R2 .....12.90
KansasCity,Mo. S5 ....12.90
Lebanon,Pa. B2 ....12.15*
Minnequa,Colo. C10 ...12.15*
Pittsburgh O3, P14 ...12.15*
Seattle B3 .....12.65*

*Untreated

AXLES

Ind.Harbor,Ind. S13 ....7.25
Johnstown,Pa. B2 .....7.25

JOINT BARS

Bessemer,Pa. U5 .....5.825
Fairfield,Ala. T2 .....5.825
Ind.Harbor,Ind. I-2 ...5.825
Joliet,Ill. U5 .....5.825
Lackawanna,N.Y. B2 ...5.825
Minnequa,Colo. C10 ...5.825
Steelton,Pa. B2 .....5.825

SCREW SPIKES

Cleveland R2 .....11.90
Pittsburgh O3 .....11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....7.90
Ind.Harbor,Ind. I-2, Y1.7.90
KansasCity,Mo. S5 ....7.90
Lebanon,Pa. B2 .....7.90
Minnequa,Colo. C10 ....7.90
Pittsburgh J5 .....7.90
Seattle B3 .....8.40
S.Chicago,Ill. R2 .....7.90
Struthers,O. Y1 .....7.90
Youngstown R2 .....7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron: Cents
98+% Fe, annealed. 9.25
Swedish, c.l.f., Camden, N. J., c.l. in bags. 9.50
Domestic, f.o.b., Johnstown, Pa., Riverton, N.J., Niagara Falls, N.Y., in bags 9.50
Canadian, f.o.b. shipping point 9.50
Electrolytic iron:
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in. 22.00
Annealed, 99.5% Fe. 36.50
Unannealed (99+% Fe) 34.00
Unannealed (99+% Fe) (minus 325 mesh) 57.00
Powder Flakes (minus 16, plus 100 mesh).. 31.00
Carbonyl Iron:
97.9-99.8% size 5 to 10 microns. .$3.00-148.00
Aluminum:
Atomized, 500 lb. drum frght. allowed
Carlots 34.50
Ton lots 36.50
Antimony, 500 lb lots 32.00*
Brass, 5000-lb lots .....38.25-52.25†
Bronze, 5000-lb lots .....63.75-67.00†
Copper:
Electrolytic 14.25*
Reduced 14.25*
Lead 7.50*
Manganese:
Minus 35 mesh 64.00
Minus 100 mesh 70.00
Minus 200 mesh 75.00
Nickel, unannealed ... $1.00
Nickel-Silver, 5000-lb lots .....59.75-62.50†
Phosphor-Bronze, ¼-ton lots 58.50
Silicon 47.50
Solder 7.00*
Stainless Steel, 302 ... 99.00
Stainless Steel, 316 .. $1.32
Tin 14.50*
Zinc 5000-lb lots 19.25-33.00‡
Tungsten Dollars
Melting grade, 99% 60 to 200 mesh:
1000 lb and over... 4.50
Less than 1000 lb.. 4.65
Chromium, electrolytic 99.8% Cr min. metallic basis 5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §40% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	...	...	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless Hills, Pa. N3	...	...	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	...	...	....	....	....	....	7	+12.25	10	+8.25	12.5	+4.75	15	+3
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless Hills, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	15.5	+2	16	+1.5	17.5	+0.75	17.5	+0.75	8	+10.75	8	+10.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Slabs	Rerolling Ingot	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	43.25	45.25	48.00	52.25	52.25
305	23.25	30.25	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	23.50	30.50	38.50	44.25	41.25	43.25	45.50	49.75	52.00	52.00
309	31.00	39.75	46.75	53.50	53.50	52.00	54.75	58.25	67.00	67.00
310	37.25	48.00	62.25	72.25	68.50	69.75	73.50	75.25	78.75	78.75
314	....	....	....	....	....	69.75	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	57.75	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.50	63.25	62.75	65.75	69.00	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	70.75	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	43.00	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	50.75	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.17
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5.	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	95.50
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	98.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max	63.50
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max)	63.50

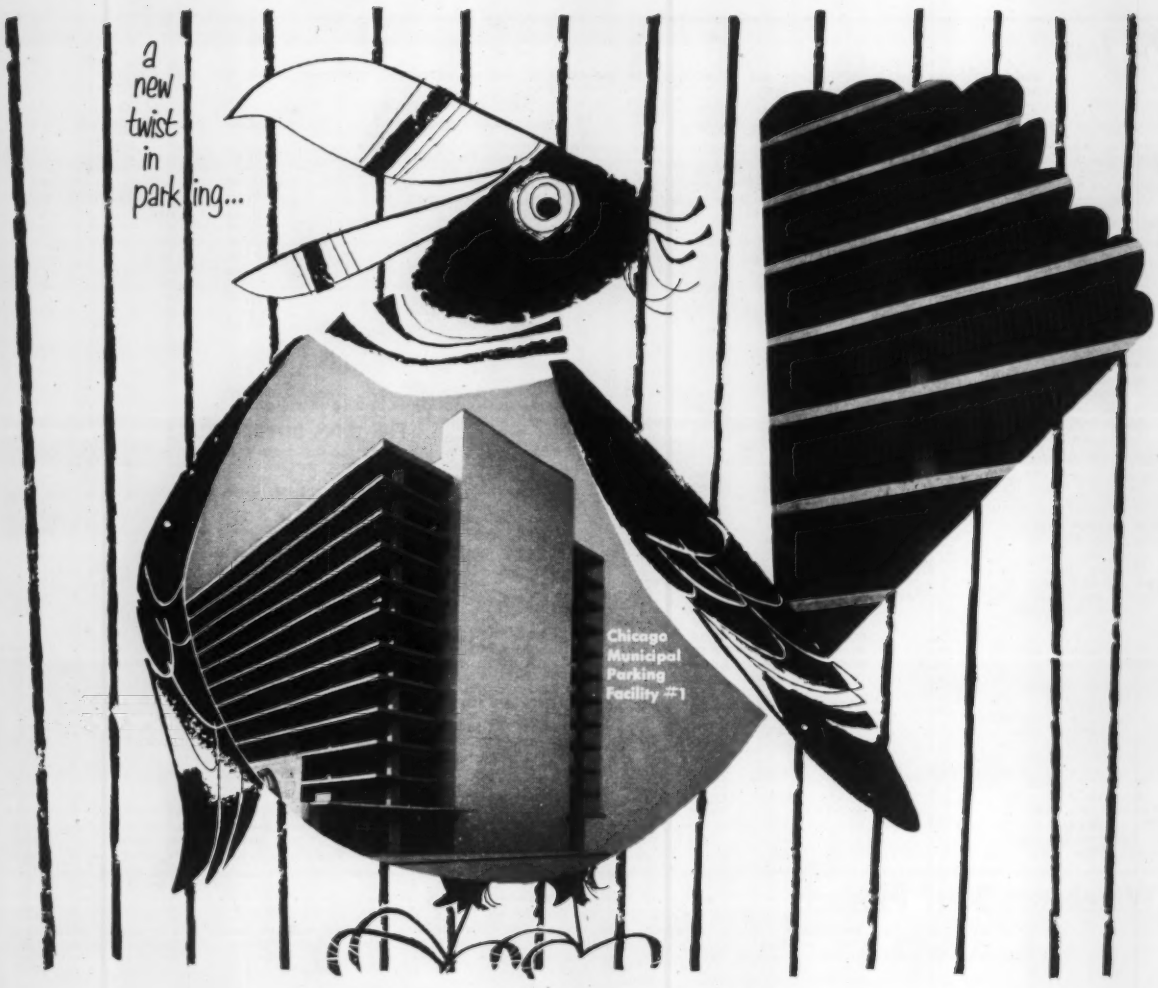
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: New York, St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.21	8.32	8.50	....	7.91	7.53	...	8.62[3]	13.49	7.93	7.21	8.98
Birmingham	7.00	8.24	8.85	....	7.21	7.27	...	9.35	....	7.43	7.14	9.34
Boston	7.75	8.81	10.27	45.57	7.96	7.87	8.40	9.67	13.50	8.13	7.89	9.36
Buffalo	7.05	8.25	10.01	....	7.35	7.35	8.20	7.90	13.35	7.60	7.35	8.90
Chattanooga	6.95	8.10	8.60	....	7.20	7.20	...	9.18	....	7.45	7.25	9.05
Chicago	7.13	8.24	9.10	49.05	7.21	7.27	7.80	7.75	13.05	7.43	7.45	8.61
Cincinnati	7.12	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.29	7.90	7.43	8.86
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.11	7.76	7.62	8.78
Detroit	7.19	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.25	7.90	7.42	8.80
Erie, Pa.	7.08	8.24	8.95[10]	....	7.31	7.35	...	8.10[10]	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	7.40	...	9.44	....	7.60	7.45	9.30
Los Angeles	8.50	10.00	11.00	51.50	8.35	8.15	8.70	10.90	14.35	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.14	7.60	7.54	8.70
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.10	....	7.63	7.34	...
New York	7.61	8.84	9.59	44.95	8.17	8.11	8.66	9.72	13.43	8.09	7.86	9.29
Norfolk, Va.	7.25	...	...	....	7.65	7.65	...	9.50	....	7.95	7.45	8.95
Philadelphia	7.32	8.42	9.37	45.98	7.93	7.68	8.21	8.46	13.21	7.74	7.68	8.80**
Pittsburgh	7.13	8.24	9.40	49.00	7.31	7.27	7.80	8.00	13.05	7.43	7.45	8.61
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	...	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	...	9.49	....	7.85	7.85	8.38	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.34	7.83	7.74	8.90
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.81	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	8.10	8.65	11.40	14.30[3]	8.20	8.00	10.20
Seattle	8.55	10.40	10.80	54.00	8.65	8.40	8.95	12.10	14.65	8.30	8.29	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	8.40	8.95	12.10	15.40	8.30	8.20	10.60
Washington	7.59	8.70	7.97	....	8.12	8.08	...	9.09	....	8.51	7.91	9.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.



12 STORY "BIRD CAGE" SEALED IN SAFETY WITH **STAINLESS STEEL STRAND!**

Want more proof of stainless steel's versatility? Here it is: this time as a protective cable barrier in the "Bird Cage" garage – Chicago's new twist in solving parking problems.

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a new twist in design... The sweep and flow of modern auto design is made possible through the beauty of stainless steel—corrosion resistance makes it ideal for interior and exterior decorative parts.

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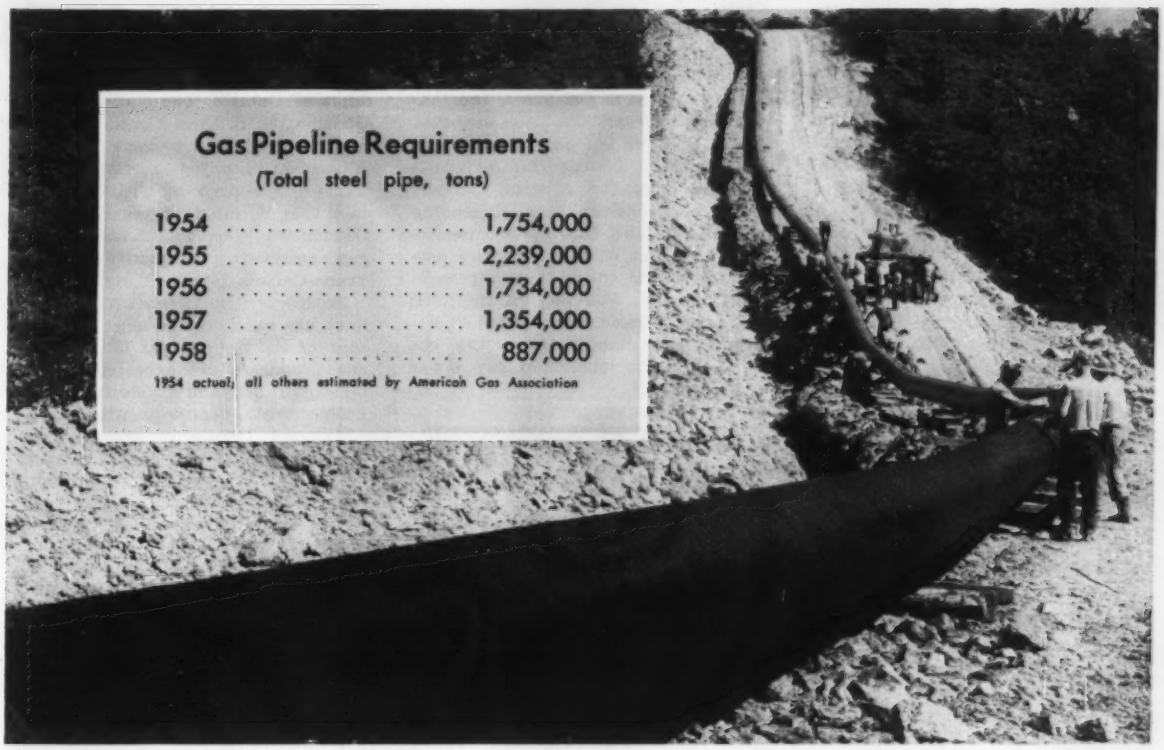

Gas Pipeline Requirements
(Total steel pipe, tons)

1954	1,754,000
1955	2,239,000
1956	1,734,000
1957	1,354,000
1958	887,000

1954 actual; all others estimated by American Gas Association

Pipelines Put Pinch on Plate

The basic transmission system for natural gas and petroleum industries is nearly completed, but there is still enough construction to keep pipe, plate supplies tight

PIPELINE construction by the nation's natural gas and petroleum transmission companies this year will fall short of the pace set last year. But don't expect this to ease the pinch on steel plate.

There are several reasons. First, pipelines will continue to take a hefty load of large-diameter pipe even though the peak of expansion is over (see table above). Second, production of plate is not keeping up with demand. In 1955, steel mills shipped 6,762,258 tons of plate. They exceeded this by 1,149,000 tons in 1951, 244,000 tons in 1952 and 906,000 tons in 1953. Third, if there is any decline in demand for plate from pipemakers, freight car builders and shipbuilders will snap it up.

Good Year—The figures above indicate that even though 1956 will not be up to 1955's level, it still will be a good year for pipelines. Statistics do not include steel pipe requirements for crude oil or refined products networks, but the picture there is similar. These two systems have less influence on plate supply and demand because they use smaller diameter pipe—much of it in the 6 to 8-in. range. Most gas pipelines are 16 in. and up.

The American Gas Association says estimates for 1957 and 1958 are admittedly conservative. They include only those projects which are fairly definite. Because of the relatively short time required to lay a major pipeline, the transmission companies do not have to plan as far in advance as other industries, such as steel. Two years from now the AGA figures could be as outmoded as last year's Easter bonnet.

System Established—Most industry spokesmen, however, feel that the nation's pipeline system will be nearly complete by year end as far as major lines are concerned. Two lines under construction will keep pipe supply tight until then. The Pacific Northwest Pipeline Co. is on the last half of its 1800-mile line from the San Juan Basin in New Mexico to the Pacific Northwest. It is expected to be in operation by next September. The American Louisiana Pipeline Co. is building a 1200-mile line from the Louisiana Gulf fields to Wisconsin and Michigan. Started last June, this line will carry over into 1957.

Midwestern Gas Transmission Corp. proposes another 1800-mile line from Emerson, Man., to Portland, Tenn. Just this month, the Coastal Transmission Corp. applied to the Federal Power Commission for approval of a line from the Rio Grande valley in Texas to Baton Rouge, La. Arkansas Louisiana Gas Co. is considering a $50-million line from Little Rock, Ark., to the Gulf Coast. Houston Gas & Oil Co. wants to build a Texas to Florida line—over 1000 miles of large diameter pipe. Several other smaller lines are in the planning stage. But they do not measure up to the flurry of building five years ago.

Scattered Trouble—Even if some of these proposals fall through, pipe

mills expect to keep busy this year. One producer says that all large-diameter pipe mills are completely sold out for 1956. Pipemakers do not anticipate any big problems in getting plate because they have pretty firm commitments far in advance from plate mills. This does not mean they don't feel the pinch. Kaiser Steel Corp. says the only limiting factor regarding line pipe sales is availability of steel. A. O. Smith Corp. eliminated one shift at its Milwaukee mill in the fourth quarter last year because of a plate shortage. Other mills report similar difficulties.

Part of the reason for the steady demand for line pipe is the constant expansion of main lines by looping or installing lateral lines. Much of this requires 30-in. pipe. While the distance per line is not great, the tonnage adds up quickly.

Big IF—The big question mark in the industry is the Trans-Canada Pipeline from the Alberta, Canada, fields to Montreal, Que. Extending about 2400 miles, this line will require the equivalent of three month's production of the entire U. S. pipemaking industry. Politics, international agreements, basic economics and competition have clouded the picture, but many industry observers say it's a sure bet the line will go through, even if the provincial governments of Canada have to finance the uneconomical portion across the wastelands of Ontario. The National Tube Division, U. S. Steel Corp., has firm commitments for a portion of the Alberta-to-Winnipeg section. N. E. Tanner, president of Trans-Canada, says that within four years, western Canada would have sufficient natural gas reserves "to justify another Trans-Canada pipeline."

Prospects for expansion of pipelines are much better since the passage of the natural gas bill. Natural gas producers are expected to step up exploration and development programs that eventually will require additions to the transmission systems. Development of year-round uses of gas, such as a gas air conditioning unit, would prevent storage of the fuel during summer months and require additional lines.

Expanding Market—The prospects of economical atomic power do not frighten gas and oil people. D. V. Stroop, executive assistant to the president of American Petroleum Institute, says it probably will mean a cut from 6 per cent a year to maybe 3 or 4 per cent in the industry's expansion. "But the nation's power and fuel requirements are increasing so rapidly that it will need both sources of supply," he says.

Chase Manhattan Bank, New York, estimates that $73.5 billion will be needed to capitalize the expansion in supply and demand of petroleum from 1955 to 1965. The Bureau of Mines estimates that this country's economy should easily find use for twice as much natural gas in 1975 as was consumed in 1950. This means heavy demands not only on pipemakers but also producers of auxiliary equipment for compressor and pump stations in the expanding pipeline system.

Tubular Goods . . .

Tubular Goods Prices, Page 174

Power plant expansion programs are requiring larger tonnages of seamless pressure tubing. Demand is so strong a construction firm in the Pittsburgh area has been unable to place an order for 700 tons for second quarter delivery.

Buyers of line pipe and oil country goods are also having trouble getting all the tonnage they need on pipe mill books. Producers of line pipe report much of their potential production committed well into 1957.

Second quarter order books have been opened on standard pipe, and strong demand is reported developing. Some building of inventories is expected over the next several months. Buying is expected to fall

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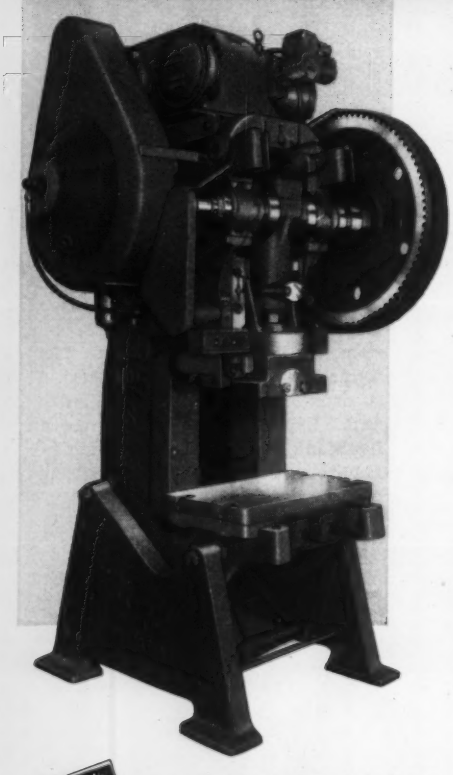

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Exceptional rigidity gives longer die life and precision products. Its ruggedness makes routine work of tough jobs while maintenance is held to a minimum.

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Capacity—56 tons. Standard stroke—4". Maximum stroke (to order)—6". Strokes per minute—46 (non-geared 95). Die space—11¼" to 18¼", stroke down, adj. up.

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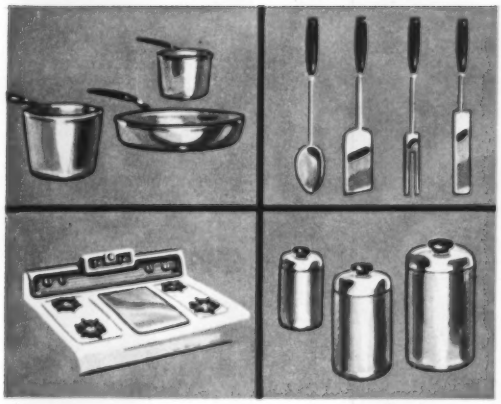

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For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

McLouth Steel Corporation
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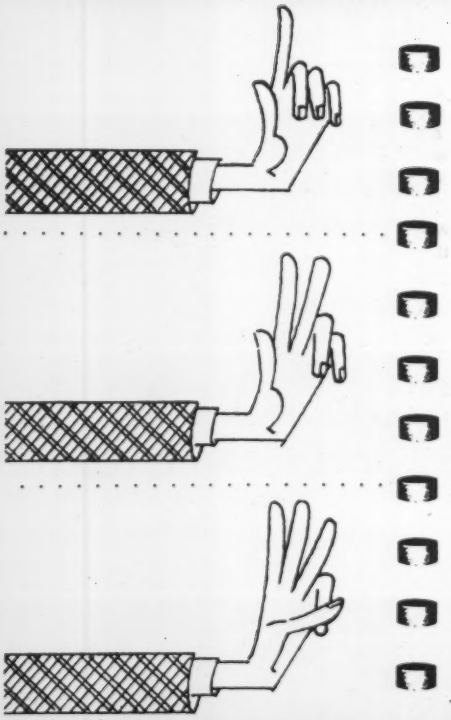

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You can increase machine tool scrap value *$20.00 and more per ton* . . . by converting bulk turnings, borings and chips into briquettes. Classified as high-grade scrap, briquettes can be charged directly into a furnace or foundry cupola.

BRIQUETTES ARE EASIER TO HANDLE

Small and uniform in size, briquettes eliminate many scrap handling problems. Current users of Milwaukee automatic briquetting presses include leading manufacturers of automobiles, aircraft, farm implements, plumbing supplies, auto parts and other high-production items.

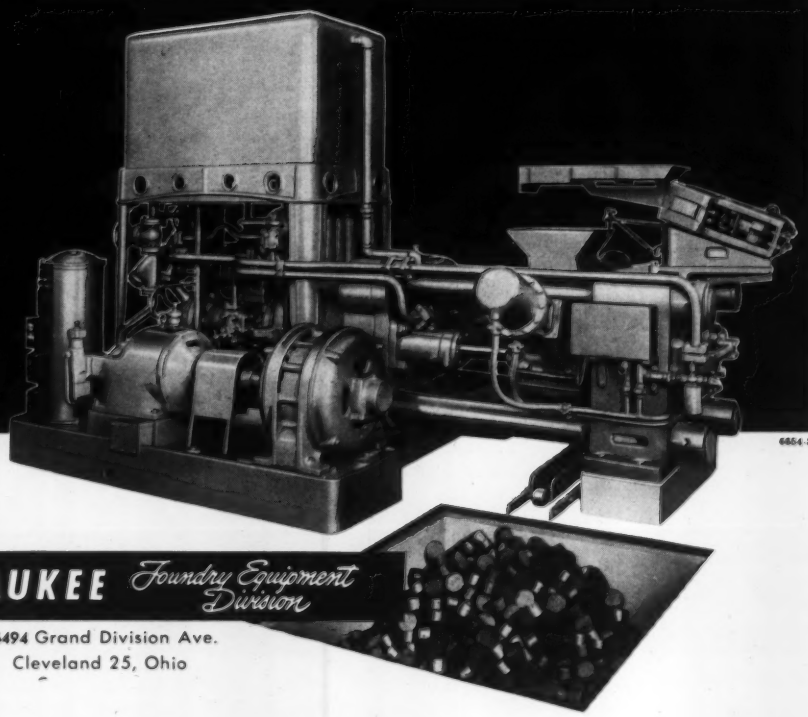
BRIQUETTES REQUIRE LESS STORAGE SPACE

Compact briquettes also greatly reduce scrap storage space. Many users, through increased profits and savings, write off initial machine cost in the first year.

Milwaukee briquetting presses are available in six sizes... capacities range from ¾ to 3½ tons per hour.

. . . WITH A *MILWAUKEE* BRIQUETTING PRESS

For complete data and specifications, write for Bulletin 117.



6654-81

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

MILWAUKEE *Foundry Equipment Division*

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Cleveland 25, Ohio

off somewhat during the summer.

Cast iron pipe requirements are picking up seasonally. Good volume business is anticipated as spring approaches.

Demand for buttweld pipe continues strong at St. Louis. Deliveries from the mills in that area vary from three to five weeks, depending on type of pipe specified. Requirements are expected to increase sharply in the spring. Lapweld, seamless and oil country goods deliveries extend as much as ten months. Some orders have been accepted for next January shipment.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 171 & 172

Some sheetmakers may give their customers a little more hot-rolled tonnage in the second quarter than they did in the first three months as result of the lag in automotive demand. The same is true of cold-rolled sheets. Of the two grades, the easier supply is more noticeable in hot rolled.

Galvanized sheets are in better supply than either hot or cold-rolled. This has been the case for weeks, however, and fairly good stocks held by manufacturers and warehouses may dwindle as spring demand develops.

Sheetmakers in the Chicago market and at other midwestern points appear more aware of lessening automotive demand for cold-rolled sheets, but, so far at least, other consumers haven't been able to get much more steel then formerly. March and April are expected to see shifts in that direction, more in hot rolled than in cold rolled. Appliance makers are still seeking more tonnage than quotas allow.

Demand for hot and cold rolled in New England is matching the slightly heavier mill offerings. This is also true of cold-rolled silicon strip in the area. Other grades require more intensified selling to take up the slack, however. Included are: hot-rolled electrical sheets; hot and cold-rolled narrow strip; enameling stock; galvanized sheets; alloy sheets, both open-hearth and electric furnace grades.

Flat-rolled buying by automotive parts suppliers for the remainder of the 1956 model season appears "over the hill." Stampers and other consumers, however, are tuning up for tooling changes required for 1957 models, pointing toward new steel orders by June.

Republic Steel Corp. has revised certain extras on silicon sheets and coiled silicon strip. The adjustments, effective Feb. 8, are in item quantity coil weights and packaging charges. The revised list supersedes the one issued Apr. 8, 1954.

Steel Bars . . .

Bar Prices, Page 170

Strong, diversified demand for hot-rolled carbon bars continues. But pressure for shipments is not quite so strong as it was some weeks back, notably in the smaller sizes and shapes. Over-all supply is tight, however, despite a leveling off in auto requirements.

Inquiry tops production in a wide range of sizes. Fastener manufacturers, cold drawers, makers of industrial equipment and other large consuming groups complain they are not getting enough tonnage for their needs. All users are specifying freely.

Most bar mills are accepting second quarter tonnage on a month-to-month basis. Acceptances do not indicate much better volume than in the first quarter.

The supply of cold-drawn bars is expected to ease next quarter. Suppliers should not be far behind on deliveries entering April. In New England, deliveries are the most extended in the cold-drawn leaded grades. Cold-rolled carbon and alloy

ERIE **Bolts • Studs • Cap Screws • Nuts**
In Alloys • Stainless • Carbon • Bronze

Only the hands of the specialist can produce fasteners which will meet your design and engineering specifications with precise accuracy. Erie has been doing just that for more than 40 years . . . producing to customer specifications bolts, studs, cap screws and nuts for use in extreme temperature, corrosion and tensile applications for a wide diversity of industries. Submit your specifications to us with confidence.

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ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

grades can be placed for April shipment in the area, but hot-rolled bar schedules are generally filled for that month. Forge shop demand is off while screw machine product requirements hold strong.

The Precision Drawn Steel Co., Camden, N. J., is increasing its capacity by one-third to well over 60,000 tons.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 170

The sales manager of a major Pittsburgh area producer of reinforcing bars reports prospects are promising for an active building season. He says demand is developing for bars required for garages, state and federal buildings and industrial plants. Another district seller says its order backlog for the second quarter is the largest since the war. It is nearly sold out through June.

Fabricators at Cleveland and other midwestern points are in receipt of a good volume of inquiry, much of it for public construction. Highway work continues prominent in reinforcing steel demand throughout the country. The scarcity of structural steel is diverting some building to reinforced concrete.

The proposed 26-story Canada House, Fifth avenue and 54th street, New York, which will be a center for Canadian governmental, business and cultural activities, will be of reinforced concrete construction because of the shortage of structural shapes.

Pacific Northwest fabricators report demand for bars in that area is above normal for this period. A number of large tonnage projects are pending in the area. Recently, 5000 tons were placed for Boeing Airplane Co. expansions at Seattle and Renton, Wash.

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THAT SPEAK *Quality*
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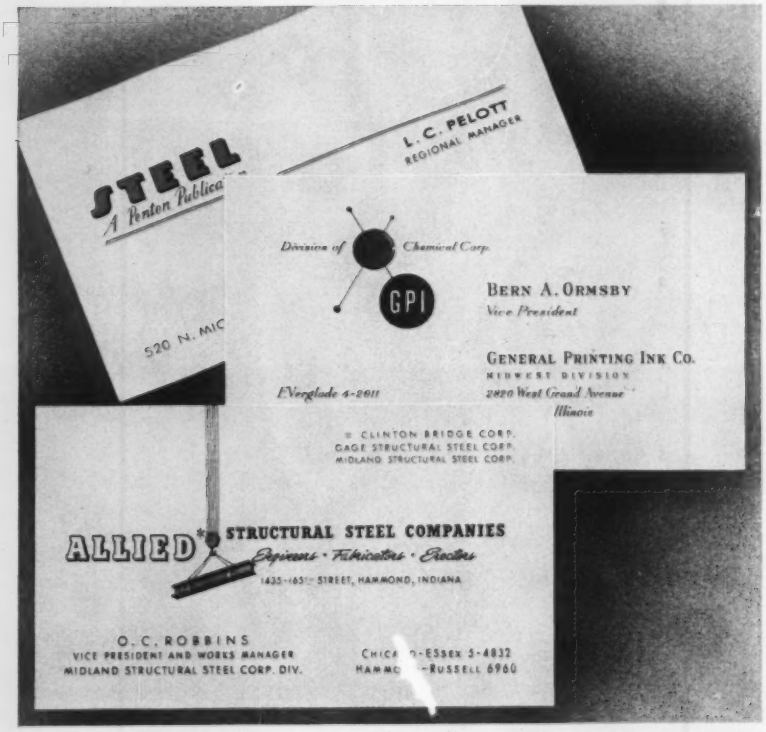

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THE JOHN B. WIGGINS COMPANY
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638 South Federal Street, Dept. S., Chicago 5, Illinois

Wire . . .

Wire Prices, Pages 172 & 173

Except for highway accessories, April wire mill schedules are filling less briskly than they were in New England. Mills are finding it necessary to prod more consumers to maintain the 45-day lead time. Demand for high carbon wire for furniture upholstery coils is off sharply, and heading wire buying is more spotty.

Automotive cutbacks have been felt by the mills, but, in general, manufacturers wire continues to move steadily on old orders. Some springmakers are building inventories even though they have had some auto order cutbacks.

Tin Plate . . .

Tin Plate Prices, Page 172

Tin plate consumption this year will likely be limited only by production of the product. Output is at capacity and must be held at that level. Every user wants more tonnage than he has been allotted.

Metal can shipments totaled 4,285,295 tons in 1955, reports the Census bureau. This compares with 4,143,229 tons the preceding year. December shipments were 270,693 tons, against 252,716 in November and 283,386 in December, 1954.

Fruit and vegetable can shipments last year were 1,486,356 tons, against 1,342,488 the year before. Beer cans (second largest category) accounted for 724,166 tons in 1955 and 646,518 in 1954.

December shipments of fruit and vegetable cans totaled 55,465 tons, compared with 62,031 in November and 65,517 in the like month of 1954. Beer cans totaled 44,256 tons, against 32,295 the preceding month and 45,946 in December, 1954.

Movement of steel shipping barrels last year amounted to 36,235,334 units. This compares with 32,551,865

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Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer $11.25
Old range nonbessemer 11.10
Mesabi bessemer 11.00
Mesabi nonbessemer 10.85
Open-hearth lump 12.10
High phos. 10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68% 20.00
N. African hematite (spot)...nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)..26.00-28.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality ..... $33.75-$34.25
Domestic, scheelite, mine 63.00

Manganese Ore

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1 ..... nom. $45.00-$50.00
48% 3:1 ..... 42.00-44.00
48% no ratio 34.00

South African Transvaal

44% no ratio ..... $19.00-$20.00
48% no ratio 33.00-35.00

Domestic

Rail nearest seller

18% 3:1 ..... $39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60% ..... $3.60-$3.85
60-65% 3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic 31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., St. Louis, $150.

Silica Brick (per 1000))

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace $13.75-14.50
Connellsville, foundry 16.00-17.00

Oven Foundry Coke

Birmingham, ovens $25.65
Cincinnati, deld. 30.58
Buffalo, ovens 27.50
Buffalo, deld. 28.75
Camden, N. J., ovens 26.50
Chicago, ovens 27.00
Chicago, deld. 28.50
Detroit, ovens 27.50
Detroit, deld. 28.50
Pontiac, deld. 29.06
Saginaw, deld. 30.58
Erie, Pa., ovens 27.50
Everett, Mass., ovens
New England, deld. *28.55
Indianapolis, ovens 26.75
Kearny, N. J., ovens 26.75
Lone Star, Tex., ovens 19.50
Milwaukee, ovens 27.50
Neville Island, (Pittsburgh) Pa., ovens.. 26.25
Painesville, O., ovens 27.50
Cleveland, deld. 29.43
Philadelphia, ovens 26.50
Portsmouth, O., ovens 24.75
Cincinnati, deld. 27.34
St. Paul, ovens 26.50
Swedeland, Pa., ovens 26.50
Terre Haute, Ind., ovens 26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene 36.00
Toluene, one deg. 32.00-34.00
Industrial xylene 32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate ..... $42-$45
Birmingham area ..... 42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5¼	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
	CARBON	
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

the year preceding. December shipments involved 3,151,853 units, against 2,968,188 in November and 2,693,228 in December, 1954.

Last year's movement of steel shipping packages, kegs and pails totaled 77,707,730 units, against 69,827,419 in 1954. December shipments were 5,749,091 units, compared with 6,080,826 in November, and 5,165,327 in December the previous year.

Stocks of steel shipping barrels at the end of December were 469,035 units; and of steel shipping packages, kegs and pails, 861,088 units.

Stainless Steel . . .

Stainless Steel Prices, Page 174

U. S. Steel Corp. has commenced installation of new heat treating facilities for stainless steel and special alloy plates at its Homestead Works, Pittsburgh.

Structural Shapes . . .

Structural Shape Prices, Page 170

More low-alloy structural steel for bridges is being specified in combination with carbon steel. Its average cost is $43 per ton higher than that for carbon, but there is some weight saving which serves as a partial offset. More than 10,000 tons are being specified for Connecticut turnpike spans.

Structural inquiry is reported expanding in the New York market, but it is not too brisk at Philadelphia. Generally, a sharp pickup in demand is expected at all points with the approach of spring.

Some of the larger fabricators will have to pass up considerable new work because of their extended backlogs. In New England, even the smaller shops hold large unfilled tonnage and are less competitive. West coast and midwest fabricators anticipate an active building season. Current demand is highly diversified, with bridge work dominating in the East.

There is a growing trend toward less bargaining over prices in New England. This is the reverse of practice in the first quarter of last year.

Erecting contractors and marginal heavy equipment fabricating shops with substantial bridge contracts are having difficulty subcontracting work. Lack of plain material and fabricating capacity are factors. Pittsburgh area contractors think steel supply conditions will get worse before they get better. Right now, one district firm is seeking to trade its second quarter plate quota for a larger wide flange beam quota. It needs beams for a highway bridge.

J. D. ZELLERBACH

Portrait by Fabian Bachrach

"Good business is for everybody...

"At Crown Zellerbach we have 24,000 employees who, like the company, have bills to pay, plans to finance, and emergencies to anticipate. This requires saving.

"Crown Zellerbach saves a portion of its annual income in U. S. Government securities. This saving is safe, systematic and, with interest, profitable. Our employees follow the same 'Good business' practice through the Payroll Savings Plan.

"At our Camas, Washington, paper mill, for instance, 1,654 employees out of a total of 2,640 set aside a portion of their income last year and bought over $450,000 worth of U. S. Savings Bonds on the Payroll Savings Plan. To them this means money for the goods of today, the ambitions of tomorrow, and the security of the future. And this way of saving has the same advantages for an individual as for a company—a safe investment, a convenient method, and a profitable return.

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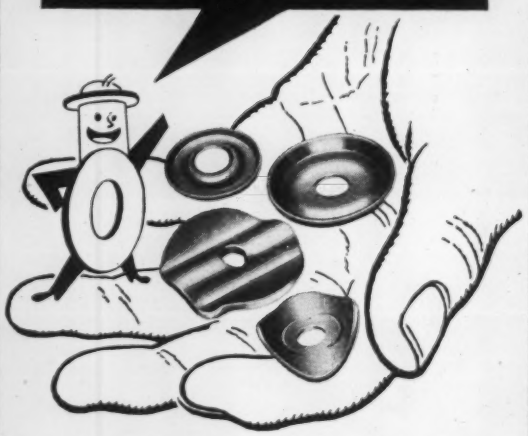

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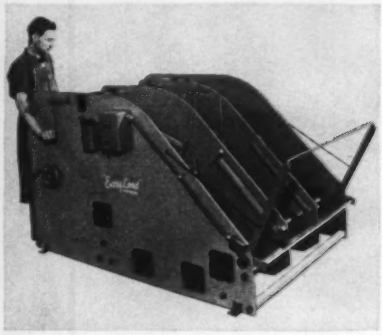

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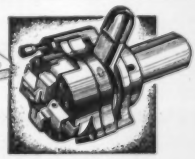

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $94; 19-21% Mn, 1-3% Si, $91.50; 16-19% Mn, $89.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $205. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $213 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 30.95c per lb of contained Mn, carload packed 32c, ton lots 33.5c, less ton 34.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.35c per lb of contained Mn, packed, carload 23.4c, ton lot 25c, less ton 26.2c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb, 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.5c per lb of alloy. Packed, c.l. 12.5c, ton 12.95c, less ton 13.95c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb. f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 12.5c per lb of briquet, c.l. packed, pallets 12.7c, bags 13.5c; 3000 lb to c.l., pallets 13.9c; 2000 lb to c.l., bags, 14.7c, less ton 15.6c. Delivered. Add 0.25a for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ⅛ lb of Si). Contract, c.l. bulk 13.15c per lb of briquet, c.l. packed, pallets, 13.35c; bags 14.15c, 3000 lb to c.l., pallets, 14.55c; 2000 lb to c.l., bags, 15.35c; less ton 16.25c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $1 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

Steel Output Sets Record

Steel production set a new monthly record in January, reports the American Iron & Steel Institute. Output was 10,811,000 net tons of ingots and steel for castings. The previous monthly record was 10,503,519 tons in December, 1955. In January, 1955, only 8,837,736 tons were poured.

The Institute's preliminary report shows that the steelmaking furnaces were operated at an average of 99.1 per cent of capacity during January —capacity, as of the beginning of the month, was 128,363,090 net tons of ingots.

In December, the furnaces operated at 98.5 per cent, based on annual rated capacity of 125.8 million tons. In January, 1955, the ingot rate averaged 82.7 per cent.

The index of steel production (1947-49 equals 100) was 152.0 in January, against 147.6 in December and 124.2 in January, 1955.

Plates . . .

Plate Prices, Page 170

If anything, plate demand is heavier. Pressure is strong from practically all consuming areas. Most mills are quoting second quarter tonnage on a month-to-month basis. This means a number of them have not accepted tonnage for shipment beyond April.

Defense-rated work appears to be

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)
1956													
†January	9,678,000	101.4	151.1	323,000	79.4	91.9	810,000	84.7	226.8	10,811,000	99.1	152.0	2,440,000
1955													
January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233
March	9,060,026	96.7	141.4	255,493	62.8	72.7	666,235	72.6	186.5	9,981,754	93.4	140.3	2,253,281
1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139
April	8,858,549	97.7	142.9	275,069	69.8	80.9	681,477	76.6	197.2	9,815,095	94.8	142.6	2,287,901
May	9,307,291	99.4	145.3	305,347	75.1	86.9	715,678	77.9	200.4	10,328,316	96.6	145.2	2,331,448
June	8,764,430	96.6	141.4	283,544	72.0	83.4	698,493	78.6	202.1	9,746,467	94.1	141.6	2,271,904
2nd Quarter	26,930,270	97.9	143.2	863,960	72.3	83.8	2,095,648	77.7	199.9	29,889,878	95.2	143.1	2,297,454
1st 6 Months	51,779,525	94.7	138.5	1,515,773	63.8	73.9	3,911,004	72.9	187.5	57,206,302	91.6	137.7	2,211,299
July	8,232,535	88.1	128.5	268,348	66.1	76.4	600,063	65.5	168.0	9,100,946	85.3	127.9	2,059,038
August	8,600,612	91.8	134.3	298,972	73.5	85.1	694,000	75.7	194.6	9,594,545	89.7	134.9	2,165,812
September	8,829,266	97.6	142.4	307,171	78.2	90.3	745,888	84.1	215.8	9,882,325	95.7	143.5	2,308,954
3rd Quarter	25,662,413	92.4	135.0	874,491	72.6	83.9	2,040,912	75.0	192.5	28,577,816	90.2	135.4	2,176,528
9 Months	77,441,938	93.9	137.3	2,390,264	66.8	77.2	5,951,916	73.6	189.2	85,784,118	91.1	136.9	2,199,593
October	9,369,704	100.0	146.3	330,150	81.2	94.0	801,196	87.3	224.3	10,501,050	98.2	147.6	2,370,440
November	9,141,244	100.8	147.5	306,674	77.9	90.2	799,480	89.9	231.3	10,247,398	99.0	148.8	2,388,671
*December	9,406,531	100.7	146.9	292,429	72.1	83.2	804,559	87.8	225.3	10,503,519	98.5	147.6	2,376,362
*4th Quarter	27,917,479	100.5	146.9	929,253	77.0	89.1	2,405,235	88.3	226.9	31,251,967	98.6	148.0	2,378,384
*Last Half	53,579,892	96.5	140.9	1,803,744	74.8	86.5	4,446,147	81.7	209.7	59,829,783	94.4	141.7	2,277,495
*Total 1955	105,359,417	95.6	139.7	3,319,517	69.3	80.2	8,357,151	77.3	198.7	117,036,085	93.0	139.7	2,244,651

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.
Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.
*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

New Aerovent "LS" Belt-Driven Fans, designed with new 4-blade "Macheta" Airfoil Propellers, provide high-volume air movement with slower motor speeds and lower horsepower requirements.

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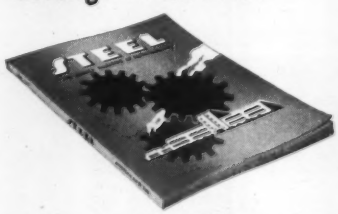

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on the increase, with consumers seizing every opportunity to use a rating if at all possible. Some time back, buyers were less zealous in this respect. The continued supply stringency, however, has sharpened their appreciation of "magic numbers."

Eastern mills have opened their books for the second quarter. The exception is a mill having operating difficulties and is so far behind on commitments that it doesn't know what new tonnage it can accept for the period.

The shortage of plates is holding up construction of barges in the Pittsburgh area.

Scrap . . .

Scrap Prices, Page 190

Philadelphia — Most scrap prices have eased more, but not sharply. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are lower at $51, delivered, and No. 2 heavy melting is at $44. Several other grades are down on light trading.

Contrary to the general downtrend, No. 2 bundles are a shade higher at $42, and low phos structurals and plate at $55-$58. Couplers, springs and wheels also are higher at $59.

Machine shop turnings and mixed borings and turnings are off $1 to $36, delivered—also short shovel turnings to $39. Heavy turnings have declined from a nominal $49 to $47. Rail crops are steady.

In the cast grades, No. 1 cupola and malleable are unchanged, but prices on heavy breakable have dropped to $32, drop broken machinery to $55.

New York—Following the recent decline in iron and steel scrap prices, brokers' buying prices are leveling off. Material is flowing into yards at a steady pace, and demand is sufficient to absorb it. The only price change noted is on No. 2 bundles, brokers reducing their prices slightly to a spread of $36-$37.

Boston—The slide in scrap prices is leveling off. Most steel grades are unchanged with heavy melting and No. 1 busheling off $4 per ton from the recent peak for district consumption. For shipment to eastern Pennsylvania, the decline has been sharper.

Pittsburgh—A district mill bought three major open-hearth grades last week at prices $1 to $2 a ton below those previously prevailing. Prices paid were $49 for No. 1 heavy melting, $44 for No. 2 heavy melting and $41 for No. 2 bundles. Turnings and borings also declined $2 a ton. The latest sale of No. 1 railroad heavy melting was at $54.50.

Cleveland — With large mill purchases lacking, prices here on the steelmaking grades of scrap are unchanged with No. 1 heavy melting $49-$50. The market in the Valley is off 50 cents to $52-$53, being sentimentally influenced by weakness in the Pittsburgh area. Mill inventories are substantial. Foundry demand is steady.

Cincinnati—A soft market continues here. Not much material is moving to the mills, and prices are largely nominal. Mills are reported to be holding comfortable inventories.

Chicago—Lower prices for steelmaking scrap have resulted from the first tests of the market since lower ground was reached over a week ago. No. 1 heavy melting steel of industrial and dealer origin is down $2 a ton. A number of dealer grades are holding at the lower prices established a week ago, but railroad items have slipped $2 to $5 a ton. Blast furnace and foundry grades are steady on light demand.

Detroit — The general trend of prices in the scrap market here appears to be downward. For the moment, however, prices seem to have leveled off. The only change noted last week was on No. 2 heavy melting steel, now quoted at $32.

St. Louis—Scrap brokers' buying prices continue to sag, being down another $1 to $2 on certain grades. Mill inventories are substantial, reportedly running 60 to 90 days. One mill, Laclede Steel Co., is on a ten-day order basis to take advantage of the weaker market.

Birmingham—There is little activity in open-hearth scrap here. Other grades are moving better but at slightly lower prices. Electric furnace material is steady. Some railroad items are off $1 to $2 a ton. Foundries are purchasing only limited tonnages of the select grades.

Los Angeles—Scrap prices declined an average of $2 a ton last week as the market softened, following a three-month period of steady advance. No. 2 heavy melting dropped from $38 to $36, No. 1 bundles from $41 to $39 and No. 2 bundles from $33 to $32. Machine shop turnings slipped to $18.

San Francisco—A recently formed Japanese cartel is spreading its scrap purchases at various ports, including those on the Gulf and east coasts. This eliminates the concentration of orders on the Pacific Coast.

Seattle — Scrap dealers expect

(*Please turn to page* 192)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 15	$49.00
Feb. 8	50.33
Jan. Avg.	52.17
Feb. 1955	36.79
Feb. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*48.00-50.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*48.00-50.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*48.00-50.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	*36.00-37.00*
Cut structurals, 3 ft lengths	*57.00-58.00*
Heavy turnings	*44.00-45.00*
Punchings & plate scrap	*57.00-58.00*
Electric furnace bundles	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	45.00-46.00
Heavy breakable cast	45.00-46.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	*53.50-54.50*
Rails, 2 ft and under	*65.00-66.00*
Rails, 18 in. and under	*66.00-67.00*
Rails, random lengths	*61.00-62.00*
Railroad specialties	*60.00-61.00*

Stainless Steel Scrap

18-8 bundles & solids	340.00-350.00
18-8 turnings	235.00-245.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	49.00-50.00
No. 2 bundles	38.00-39.00
No. 1 busheling	49.00-50.00
Machine shop turnings	29.00-30.00
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Low phos.	*54.00-55.00*
Cut structural plates 2 ft and under	54.00-55.00
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	49.50-50.50

Cast Iron Grades

No. 1 cupola	54.00-55.00
Charging box cast	47.00-48.00
Stove plate	53.00-54.00
Heavy breakable cast	46.00-47.00
Unstripped motor blocks	36.00-37.00
Brake shoes	41.00-42.00
Clean auto cast	53.00-54.00
Burnt cast	41.00-42.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	*69.00-70.00*
Rails, 18 in. and under	*70.00-71.00*
Rails, random lengths	65.00-66.00
Cast steel	*59.00-60.00*
Railroad specialties	*59.00-60.00*
Uncut tires	60.00-61.00
Angles, splice bars	*63.00-64.00*
Rails, rerolling	*67.00-68.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	340.00-350.00
18-8 turnings	200.00-210.00
430 clips, bundles, solids	105.00-115.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	44.00-45.00
No. 1 bundles	*52.00-53.00*
No. 2 bundles	39.00-40.00
No. 1 busheling	*52.00-53.00*
Machine shop turnings	31.50-32.50
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Low phos.	*53.00-54.00*
Electric furnace bundles	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt	*54.00-55.00*

CHICAGO

No. 1 heavy melting	*46.00-48.00*
No. 2 heavy melting	37.00-38.00
No. 1 dealer bundles	46.00-47.00
No. 1 factory bundles	50.00-51.00
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*46.00-48.00*
Machine shop turnings	25.00-26.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Cut structurals, 3 ft	*52.00-53.00*
Punchings & plate scrap	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	38.00-39.00
Unstripped motor blocks	36.00-37.00
Clean auto cast	51.00-52.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt	*58.00-59.00*
R.R. malleable	59.00-61.00
Rails, 2 ft and under	*62.00-63.00*
Rails, 18 in. and under	*63.00-64.00*
Angles, splice bars	*60.00-61.00*
Rails, rerolling	*65.00-67.00*

Stainless Steel Scrap

18-8 bundles & solids	335.00-350.00
18-8 turnings	240.00-250.00
430 bundles & solids	110.00-115.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	46.00
No. 2 heavy melting	*32.00*
No. 1 bundles	46.00
No. 2 bundles	33.00
No. 1 busheling	46.00
Machine shop turnings	22.00
Mixed borings, turnings	22.00
Short shovel turnings	25.00
Punching & plate scrap	**55.00**

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	37.00
Stove plate	37.00
Heavy breakable	35.00
Unstripped motor blocks	25.00
Clean auto cast	46.00
Malleable	42.00

BIRMINGHAM

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*41.00-42.00*
Cast iron borings	19.00-20.00
Short shovel turnings	30.00-31.00
Machine shop turnings	29.00-30.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft	51.00-52.00
Unstripped motor blocks	39.00-40.00
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt	*49.00-50.00*
Rails, 18-in. and under	*63.00-64.00*
Rails, rerolling	62.00-63.00
Rails, random lengths	*58.00-59.00*
Angles, splice bars	57.00-58.00

PHILADELPHIA

No. 1 heavy melting	*51.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	*51.00*
No. 2 bundles	*42.00*
No. 1 busheling	*51.00*
Electric furnace bundles	54.00
Machine shop turnings	*36.50*
Mixed borings, turnings	*36.50*
Short shovel turnings	*39.00*
Heavy turnings	*47.00*
Structurals & plate	*55.00-58.00*
Couplers, springs, wheels	*59.00*
Rail crops, 2 ft & under	64.00-65.00†

Cast Iron Grades

No. 1 cupola	50.00
Malleable	68.00
Heavy breakable cast	*52.00*
Drop broken machinery	*55.00*

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	44.00-45.00
No. 2 bundles	*36.00-37.00*
Machine shop turnings	26.00-27.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	30.00-31.00
Low phos. (structural & plate)	48.00-50.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Unstripped motor blocks	30.00-32.00
Heavy breakable	45.00-46.00

Stainless Steel

18-8 sheets, clips solids	320.00-325.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-41.50
No. 2 heavy melting	32.00-33.00
No. 1 bundles	41.00-41.50
No. 2 bundles	31.00-31.50
Machine shop turnings	26.00-26.50
Mixed borings, turnings	27.00-27.50
Short shovel turnings	29.00-29.50
No. 1 cast	41.00-42.00
Mixed cupola cast	39.00-40.00
No. 1 machinery cast	45.00-46.00

BUFFALO

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	46.00-47.00
No. 2 bundles	37.00-38.00
No. 1 busheling	46.00-47.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	28.00-29.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	46.00-47.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	60.00-61.00
Rails, 3 ft and under	62.00-63.00
Railroad specialties	54.00-55.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	38.00-39.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Machine shop turnings	30.50
Mixed borings, turnings	30.50-31.00
Short shovel turnings	33.50
Cast iron borings	30.50-31.00
Low phos., 18 in.	54.00-55.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	*51.00-52.00*
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	40.50
No. 2 heavy melting	*37.00*
No. 1 bundles	40.50
No. 2 bundles	*32.00*
No. 1 busheling	40.50
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	*40.00*
Heavy breakable cast	*38.00*
Unstripped motor blocks	*38.00*
Brake shoes	43.00
Clean auto cast	48.00
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt	50.50
Rails, 18 in. and under	66.00
Rails, random lengths	60.00
Rails, rerolling	66.00
Angles, splice bars	54.00

SEATTLE

No. 1 heavy melting	42.00
No. 2 heavy melting	38.00
No. 1 bundles	34.00
No. 2 bundles	32.00
No. 3 bundles	25.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, bundles	55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-43.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	33.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	35.00
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	42.00
No. 2 heavy melting	38.00
No. 1 bundles	41.00
No. 2 bundles	33.00
Machine shop turnings	20.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.00

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	35.00
No. 1 bundles	39.00
No. 2 bundles	*32.00*
No. 1 busheling	40.00
Machine shop turnings	23.00
Mixed borings, turnings	23.00
Cast iron borings	23.00
Short shovel turnings	25.00
Cut structurals	49.00
Heavy turnings	23.00
Punchings & Plate scrap	44.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	50.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT.

No. 1 heavy melting	45.50
No. 2 heavy melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	38.00
Mixed borings, turnings	19.00
Rails, remelting	54.50
Busheling, new factory: Prepared	43.50
Unprepared	39.50
Short steel turnings	27.50

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b. shipping point.

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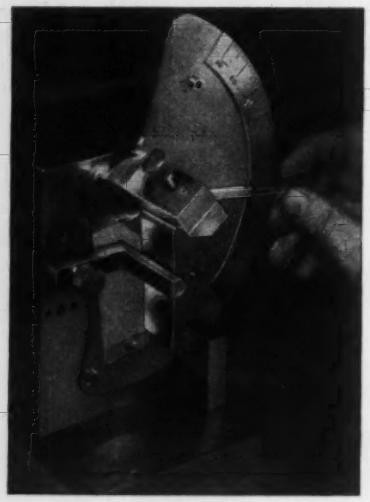

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WATERBURY, CONN.

(*Concluded from page* 189)

there will be further price adjustments. Domestic demand continues strong, but since the recent price break, country dealers have been holding back shipments. Some new export business has been closed at the recently revised price levels prevailing in the area.

Pig Iron . . .

Pig Iron Prices, Page 175

Except for automotive and strike-bound foundries, including those of a farm equipment maker, demand for pig iron holds steady.

Most consumers of foundry iron have built inventories to a satisfactory point, buying having been stimulated by the possibility of higher freight rates later this month. In no instance does it appear that inventory buying has been excessive.

Shipments are being maintained at a high rate and likely will tighten again in 60 days or so when auto assemblies are expected to move upward.

Activity in the foreign market is slow. A relatively small tonnage is being imported at eastern ports. Exports also are light.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 184

Some slackening in demand for oven foundry coke is reported. Largely, this reflects slower melting rates at foundries serving the automotive industry. In the Chicago district, the shutdown of Deere & Co. foundries by a strike is also an important factor in the market.

Warehouse . . .

Warehouse Prices, Page 175

Distributors are revising their prices on some products to compensate for recent mill extra increases. They plan additional adjustments should freight rates go up late this month.

Warehouse receipts from the mills are only slightly improved. Larger deliveries are expected, however, because of the recent automotive cutbacks.

Where stocks are available, demand is heavy enough for annual warehouse stock turnover of 2.75 times. This compares with an average of three times last year. Stocks of alloys (including stainless), cold-finished bars, tubular products and strip are reported by the distributors to be reasonably well balanced.

In New England, structural inventories are about 40 per cent of normal, both in sizes and tonnage; plates, about 20 per cent in size and 30 per cent in tonnage. Machine tool, building and the electronics industries are among the most active warehouse customers in that district.

Increases in industrial construction have boosted demand for wire, grating and corrugated sheet in the Pittsburgh area. One district distrib-

Finished Steel Shipments—1955

(All grades; net tons)

PRODUCTS	CARBON	ALLOY	STAINLESS	1955 TOTAL	1954 TOTAL
Ingots	474,017	178,015	26,598	678,630	316,664
Blooms, slabs, etc.	2,154,359	568,167	21,951	2,744,477	1,530,025
Skelp	191,591	.....	.....	191,591	129,679
Wire rods	1,171,780	23,751	8,311	1,203,842	760,885
Structurals (heavy)	4,695,863	40,963	161	4,736,987	4,501,183
Steel piling	391,295	53	.....	391,348	387,654
Plates	6,403,047	334,948	24,263	6,762,258	5,340,262
Rails (standard)	1,150,976	1	.....	1,150,977	1,113,366
Rails (all other)	82,766	1	.....	82,767	83,577
Joint bars	68,314	.....	.....	68,314	64,304
Tie plates	311,411	.....	.....	311,411	236,011
Track spikes	93,097	.....	.....	93,097	65,608
Wheels	305,287	1,119	.....	306,406	192,483
Axles	119,103	143	.....	119,246	60,956
Bars (hot-rolled)	6,571,349	2,180,042	46,870	8,798,261	6,255,465
Bars (reinforcing)	2,164,641	.....	.....	2,164,641	1,750,957
Bars (cold-finished)	1,526,795	297,429	53,737	1,877,961	1,210,273
Tool steel	15,452	99,077	.....	114,529	84,143
Standard pipe	2,967,501	732	8	2,968,241	2,320,265
Oil country goods	2,120,896	421,213	.....	2,542,109	2,291,176
Line pipe	3,083,705	31	.....	3,083,736	2,594,873
Mechanical tubing	695,589	265,183	5,057	965,829	674,214
Pressure tubing	233,106	28,101	14,861	276,068	277,208
Wire (drawn)	3,112,883	47,528	32,267	3,192,678	2,420,982
Nails and staples	650,955	.....	1	650,956	567,382
Barbed wire	113,372	.....	.....	113,372	132,346
Woven wire fence	312,156	.....	2	312,158	299,917
Bale ties	60,389	.....	.....	60,389	51,749
Black plate	797,720	.....	.....	797,720	672,803
Tin & terne plate HD	1,100,762	.....	.....	1,100,762	1,307,096
Tin plate, electrolytic	4,503,637	.....	.....	4,503,637	3,680,467
Sheets (hot-rolled)	9,021,769	373,536	35,406	9,430,711	6,094,268
Sheets (cold-rolled)	14,964,019	60,191	143,419	15,167,629	9,605,689
Sheets (galvanized)	2,863,832	665	.....	2,864,497	2,362,632
Sheets (other coated)	275,046	.....	.....	275,046	178,961
Sheets (enameling)	Included in cold-rolled sheets				180,218
Elec. sheets and strip	130,576	660,467	.....	791,043	588,851
Strip (hot-rolled)	2,051,367	32,769	5,355	2,089,491	1,486,141
Strip (cold-rolled)	1,451,054	15,393	268,182	1,734,629	1,281,993
Total Shipments	78,401,477	5,629,518	686,449	84,717,444	63,152,726

utor reports January was its best peacetime month, and its second best for all time.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4000 tons, additions, Chevrolet assembly plant and Fisher Body plant, Janesville, Wis., for General Motors Corp., to Wisconsin Bridge & Iron Co., Milwaukee.

3050 tons, bridge superstructure, Fairfax project, Missouri river, Platte-Wyandotte counties, Missouri, to Kansas City Bridge Co., Kansas City, Mo.; bids direct.

300 tons, state highway bridges, relocation, Route 3, Plymouth-Bourne, Mass., to Tower Iron Works, Providence, R. I., through J. F. White Contracting Co., Westwood, Mass., general contractor.

STRUCTURAL STEEL PENDING

2000 tons (also unstated tonnage of reinforcing bars), city-county building, Tacoma, Wash; bids postponed from Feb. 14 to Feb. 21.

1120 tons, warehouse, shops and administration building, Air Force Academy, Colorado Springs, Colo.; bids direct Mar. 6.

500 tons or more, Navy catapult and arresting facilities, Lakehurst, N. J.

475 tons, Queen Lane filter plant, Philadelphia; Laub Construction Co., Philadelphia, general contractor.

400 tons, high school, Elizabethtown, Pa.

100 tons, 31 stoplogs for Bonneville dam; bids to U. S. Engineer, Portland, Oreg., Mar. 6.

Unstated, six bridge superstructures, 115 ft to 274 ft in length, Garden State Parkway contract No. 206, section 1A, Bergen county, N. J.; bids closed by New Jersey Highway Authority, Red Bank, N. J., Mar. 8; structural steel and prestressed concrete beam alternate; 207 tons of reinforcing steel in over-all project.

REINFORCING BARS . . .

REINFORCING BARS PLACED

4000 tons, Boeing Airplane Co., Seattle plant expansion to Bethlehem Pacific Coast Steel Corp., Seattle; The Austin Co., Seattle, general contractor.

170 tons, dormitory-dining hall, Lowry Air Force Base, Denver, to Colorado Builders Supply Co., Denver; J. W. Bateson Co., Dallas, general contractor; Southern Industrial Steel Co., 75 tons of fabricated structural steel.

90 tons, additional award, Capitol Lake bridge piling, Washington state, to Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, general contractor.

REINFORCING BARS PENDING

1000 tons, Boeing Airplane Co., Renton, Wash., plant expansion.

400 tons, guided missile projects, Fairchild Field, Wash.; bids to U. S. Engineer, Seattle, postponed from Mar. 7 to Mar. 14.

207 tons, bridge work, Garden State Parkway, contract 206, section 1A, Bergen county, N.J.; bids closed by New Jersey Highway Authority, Red Bank, N. J., Mar. 8.

104 tons, (also 65 tons of shapes), Evergreen pumping station; bids to Bureau of Reclamation, Ephrata, Wash., Mar. 6.

PLATES . . .

PLATES PLACED

100 tons, elevated water storage tank, Minot Air Force Base, N. Dak., to Darby Products, Steel Plate Corp., Kansas City, Kans.

PLATES PENDING

2000 tons, 36 and 24 in., ¾ and 5/16-in. water pipe, Mercer Island Water District, Seattle; plans approved; bids to be asked late in February.

PIPE . . .

CAST IRON PIPE PLACED

131 tons, 12 in. for Bremerton, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Virginian Railway, eight diesel locomotives, to Fairbanks, Morse & Co., Chicago.

FOR SALE

BILLETS - AIRCRAFT QUALITY NITRIDING STEEL

Approx. 1000 Tons

5¾" Round

15" to 23" Lengths

Spec.: AMS 6470

For Forging or Rerolling

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Penton Bldg. Cleveland 13, Ohio

FOR SALE

Wm. Sellers Co. Plate Edge Planer, Type C Serial 1398. Capacity for planing and scarphing 2" x 36'. Base top working surface 30" x 38'. 34 Hyd. Jacks. O/A length 51'. With 50 H.P G.E. Motor, 230 V-DC. Details on request.

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For QUALITY CONTROL ENGINEERS with training or experience in the field of process analysis and statistical analysis.

For PRODUCTION RESEARCH ENGINEERS who have experience in operational analysis, operating procedures development, material handling, product protection and materials research.

We may have the opening you are looking for to provide you with the opportunity to fully utilize your capacity and meet your needs in an expanding progressive organization.

Must be willing to relocate in SO. CALIF. at Fontana plant of the KAISER STEEL CORPORATION.

Send complete resume including education, experience and salary requirements to: Employment Manager.

KAISER STEEL CORPORATION

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Fontana, California

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AAA-1 Company wants experienced plant manager to take charge of structural steel fabricating plant. Plant has 2,500—3,000 tons monthly capacity. Located in Midwest. Applicant must be completely familiar with all phases of structural steel fabrication for heavy bridges and building fabrication. This is a once in a lifetime opportunity for the right person who possesses the necessary experience, executive ability, and technical knowledge. Write full details including age, education, and experience. Salary open.

Write Box 378, STEEL

Penton Building Cleveland 13, Ohio

CLASSIFIED

Representatives Wanted

DETROIT and CHICAGO areas open for MANUFACTURERS REPRESENTATIVES for firm manufacturing powder metal bronze bearings and structural parts. Write giving full particulars on education, experience and other lines represented. Reply Box 374, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES REPRESENTATIVE

MEDIUM SIZED OPEN HEARTH STEEL FOUNDRY OFFERS EXCELLENT OPPORTUNITY TO AGGRESSIVE SALESMAN. TERRITORY WOULD BE EASTERN PART OF NEW YORK STATE, NEW JERSEY, EASTERN PENNSYLVANIA AND MARYLAND. SEND FULL QUALIFICATIONS AND SALARY REQUIREMENT IN FIRST LETTER. ADDRESS BOX 379, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

COMMISSION MANUFACTURERS REPRESENTATIVE

A MEDIUM SIZED OPEN HEARTH STEEL FOUNDRY SEEKS REPRESENTATION IN THE NEW YORK, NEW JERSEY AREA. ONE CALLING ON MACHINERY MANUFACTURERS AND FABRICATORS AND KNOWN USERS OF STEEL CASTINGS PREFERRED. STRAIGHT COMMISSION. WRITE BOX 380, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

COMMISSION MANUFACTURERS REPRESENTATIVE

A MEDIUM SIZED OPEN HEARTH STEEL FOUNDRY SEEKS REPRESENTATION IN BALTIMORE, PHILADELPHIA, YORK AND HARRISBURG, PA. AREA. ONE CALLING ON MACHINERY MANUFACTURERS AND FABRICATORS AND KNOWN USERS OF STEEL CASTINGS PREFERRED. STRAIGHT COMMISSION. WRITE BOX 381, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

Positions Wanted

MELTER

Sixteen years' experience on Electric Arc Furnace. Would consider foreign situation. Reply Box 372, STEEL, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OF INDUSTRIAL ENGINEERING at integrated steel plant interested in job in steel industry in South, in West or Abroad. Reply Box 373, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED

Help Wanted

DEVELOPMENT ENGINEER

Well established producer and fabricator of welded steel tubing requires aggressive engineer with mechanical and electrical background and experience. Will be in complete charge of Production Development, Tools, Dies and Equipment and General Plant Engineering. Good salary and other benefits. Replies confidential to Box 375, STEEL, Penton Bldg., Cleveland 13, Ohio.

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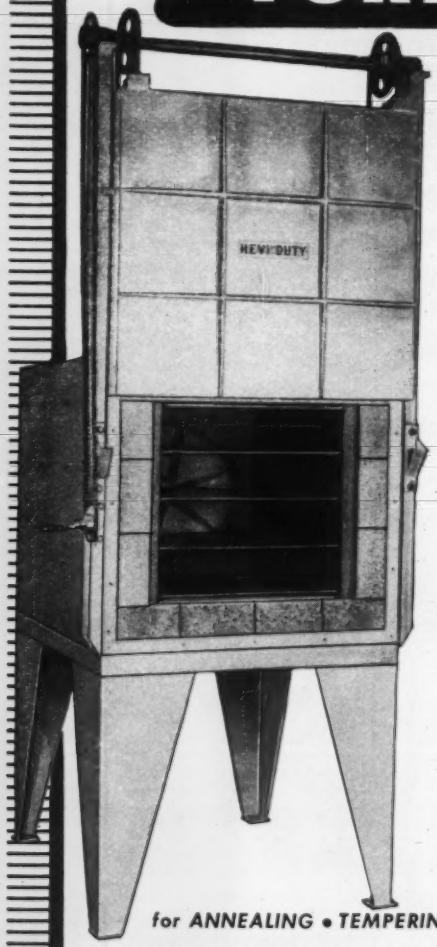
For Industrial steel warehouse in Southern city of 800,000 population. Products handled mostly hot rolled bars, structurals, plates, sheets, etc. Logical distribution area is surrounding area of 350 miles. We are interested only if you are experienced in steel warehouse sales, completely capable of supervising outside and inside salesmen, and if you are aggressive "pusher" type. This is a wonderful opportunity and offers unlimited opportunity for the right man. If to accept this position you must leave your present job, give full details why you wish to leave. All replies held in strictest confidence. Please do not apply unless you completely fill qualifications. Write Box 377, STEEL, Penton Bldg., Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 46 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered: present position protected. Ask for particulars. R. W. BIXBY, INC., 565 Brisbane Bldg., Buffalo 3, N.Y.

HEVI DUTY TEMPERITE CONVECTION FURNACES

WITH DIRECTED CIRCULATION



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Forced convection by a high speed fan transfers the heat rapidly and uniformly from the elements to the work. A heat resistant alloy baffle directs the flow of air between the baffle and the heating elements into the work chamber and back to the fan intake. Positive air circulation in all parts of the furnace chamber assures even temperature throughout and the rapid heating of dense loads. Process temperatures can be maintained within very narrow limits—thus exacting results may be more easily obtained.

Complete information available in Bulletin 355.

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Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers ***Constant Current Regulators***

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Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
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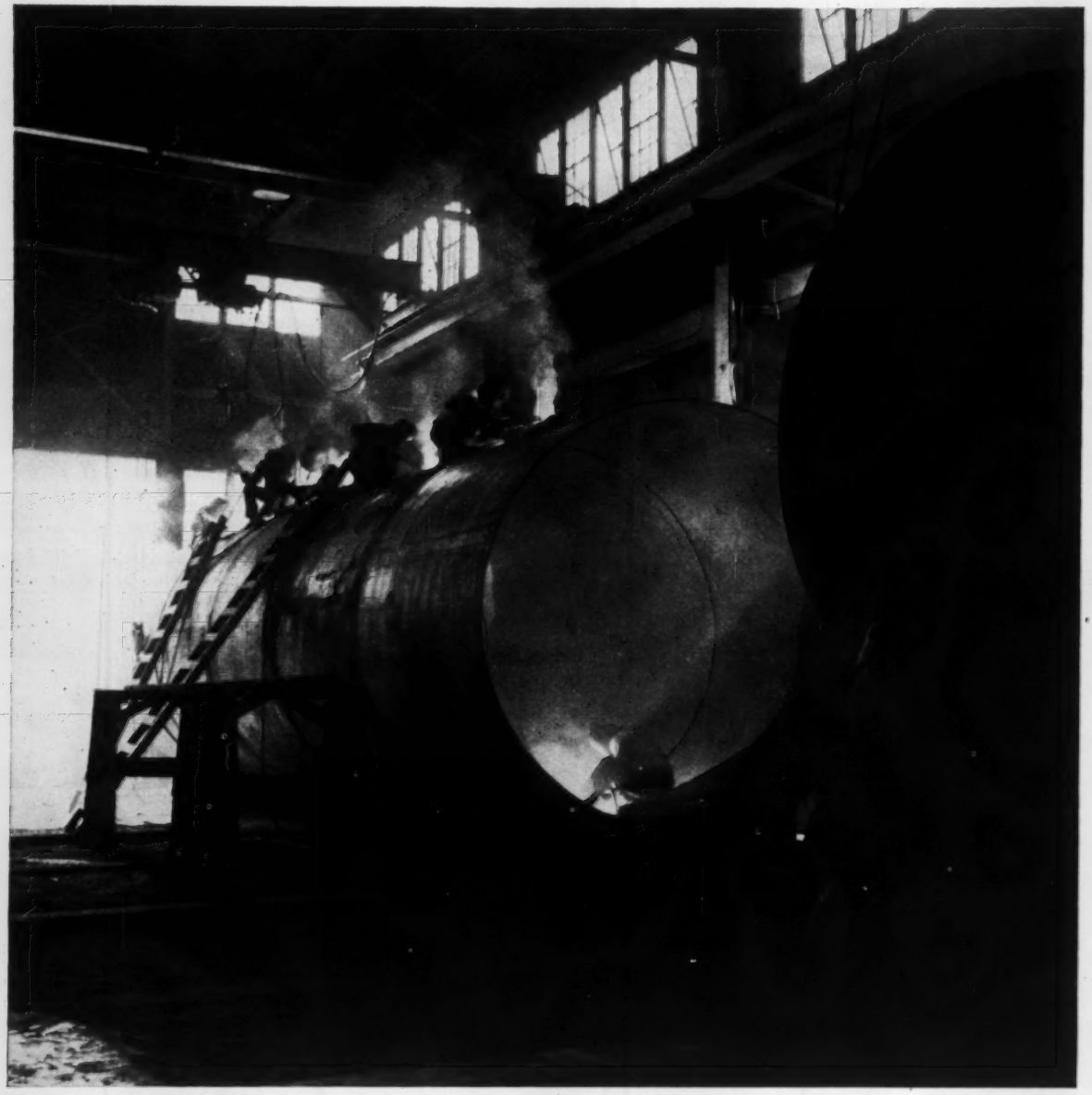
GREY IRON CASTINGS



Welding Steel Plates for Jet Fuel Storage Tanks

Here, in the making, is a huge welded tank for the underground storage of fuel for jet planes. It is one of many being manufactured by Massachusetts Engineering Company, North Quincy, Mass., for the New England Div., Corps of Engineers, U. S. Army.

The tank, fabricated from 7/16-in. Bethlehem steel plates, is 77 ft 6 in. long, and 10 ft 6 in. in diameter. It has a capacity of 50,000 gal, and weighs 54,000 lb. Welded construction is used throughout.

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Bethlehem plates come in a full range of sheared and universal mill sizes. For complete information, including delivery schedules, just write or phone the nearest Bethlehem district sales office.

BETHLEHEM STEEL COMPANY
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BETHLEHEM STEEL

BETHLEHEM STEEL

A coke oven battery reversing machine designed and installed by the Wilputte Coke Oven Division, Allied Chemical & Dye Corporation.

CLEVELAND makes a reversing machine behave

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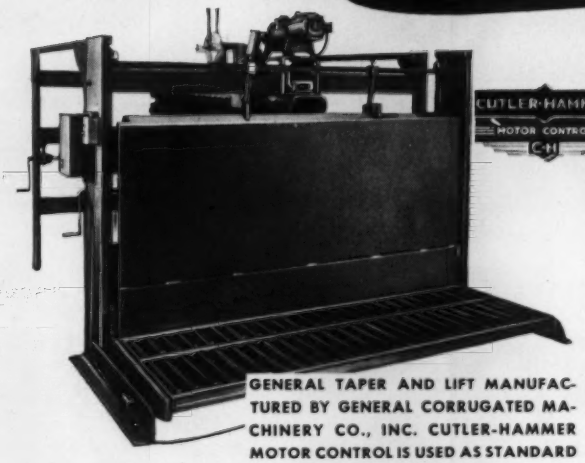

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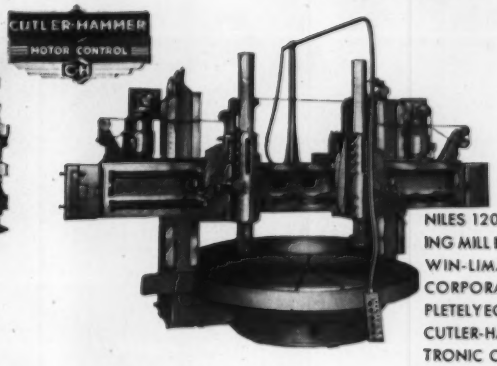

NILES 120" TANK BORING MILL BUILT BY BALDWIN-LIMA-HAMILTON CORPORATION. COMPLETELY EQUIPPED WITH CUTLER-HAMMER ELECTRONIC CONTROL.

The pressure's on!

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That such a high percentage of leading machinery builders use and in a growing number of cases *insist* on Cutler-Hammer Motor Control to the exclusion of all others, is a most revealing commentary. It may be the most searching evaluation of all, of the quality and dependability and leadership of Cutler-Hammer Control . . . itself under pressure since its inception more than 60 years ago . . . CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.